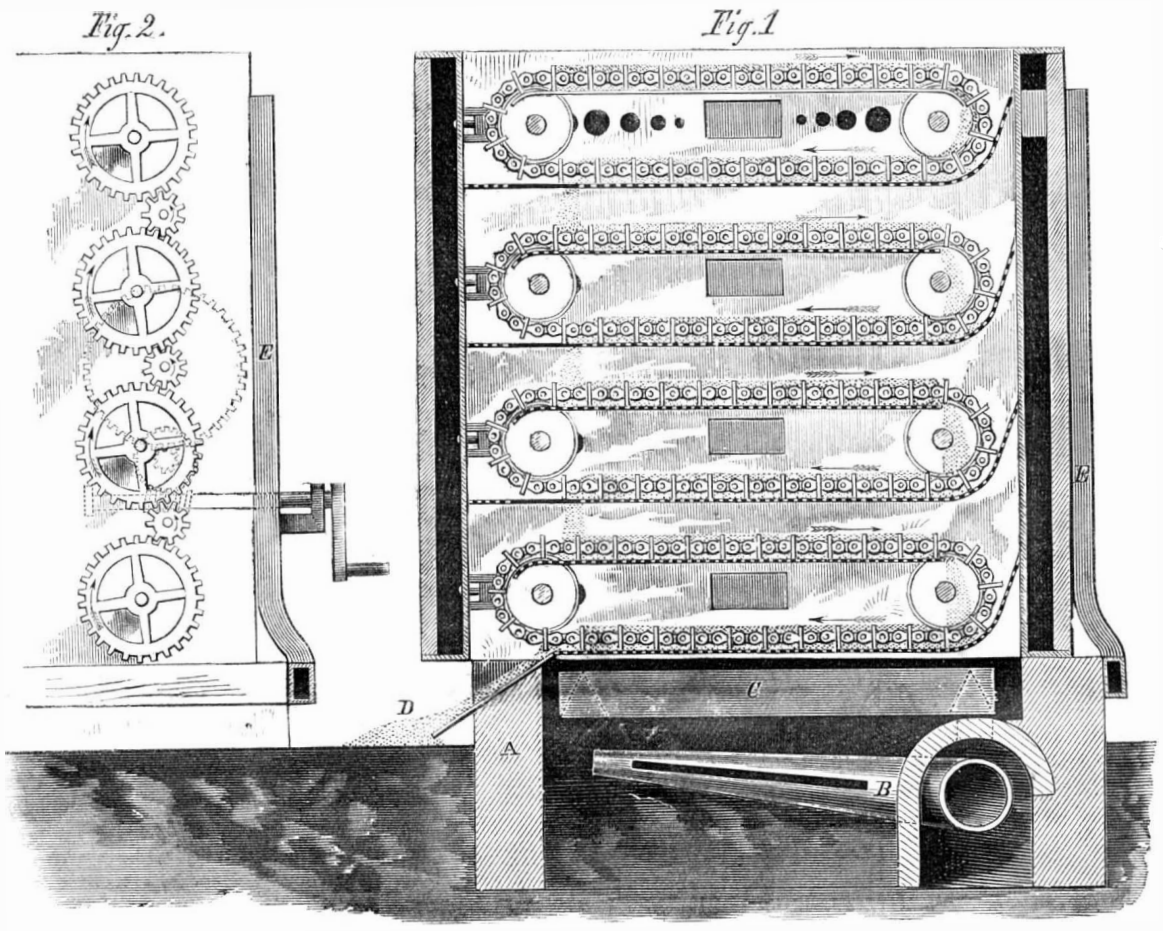
SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES

Vol. XVIII.--No. 23. [NEW SERIES.] NEW YORK, JUNE 6, 1868. $3 per Annum [IN ADVANCE.]

Improvement in Malt and Grain Kilns.

The drying of malt as ordinarily practiced, by spreading it upon the floor of a room, the floor being composed of perforated iron or clay tiles, is an onerous labor and greatly exhausting, because of the excessive heat and the vapors arising from the mass. The workman is exposed to the heat of the furnaces beneath the floor, while his work of turning and mixing the malt is of the most laborious character. All this exposure and most of the manual labor are saved by the use of the machine shown in the engravings, which is essentially self-acting. Fig. 1 is a vertical transverse section, and Fig. 2 also a vertical view of the driving and connecting parts of the device.



DE BARY'S PATENT GRAIN AND MALT DRYER.

The dryer is a rectangular case, the outside walls being of wood or metal, and the inner wall of sheet metal, with a space between the two filled with air or a non-conducting material, to prevent the loss of heat by radiation. The case is fixed on a foundation, A, into which is conducted a hot-air pipe, B, and a sinuous or zigzag flue, C, from a furnace. The flue is of this form to give as large an area of heating surface as possible, and the pipe, B, has one or more longitudinal slots, as seen, for a similar purpose. When the case is heated by the pipe, B, the hot air is forced through it by means of a fan or other equivalent, but when the furnace flue, C, is used, the case is heated simply by the radiation of the heat. The latter is used when only a gentle heat is required, and the former when a greater and more rapid heat is desirable.

Within the casing is a series of endless aprons or carriers, consisting of machine chains, passing at each end over suitable wheels and driven by the train of gears seen in Fig. 2. They may be driven by power or by hand, as is convenient. Between these chains on each carrier is a series of slats extending across the interior of the casing and traversing on fixed perforated plates, the surfaces of which they sweep; the upper plate of the upper carrier only being solid. The malt or grain is deposited on the upper carrier and is conveyed along on the solid plate of the top carrier and deposited on the perforated plate underneath, from which it is discharged at one end, as seen in Fig. 1, to be again carried across in the direction of the arrows, and so on to the bottom, where it is dropped, at D. The shafts at one end of these carriers are attached to the side of the case by bolts, by which they can be adjusted when the chains or any other parts become loosened by wear. The hot air in passing up in the casing, through the perforated plates and the malt, carries off the moisture through the side tubes, E, represented in both figures; and it will be seen that the malt or grain is subjected gradually to the heat, as the temperature of the kiln increases gradually from its top downward, and the grain must pass over a large area within a small compass.

This is a German invention, patented in this country through the Scientific American Patent Agency, March 10, 1868, by Wm. Einstein, the assignee for this country. It is in use at some of the most extensive breweries of Southern Germany, as that of Anton Drehers, the Spaten brewery, and the Lion brewery of Munich, and many others. Its advantages are summed up by the patentee as follows: It occupies only one tenth of the ground space of others; one laborer can attend to two kilns; there is no stirring and turning of the malt by manual labor; there is no interruption to the process; the malt is carried gradually to a higher temperature, while it is always in continuous motion; the kiln may be regulated to give the malt any color desired; it requires less fuel than others and yields a superior product.

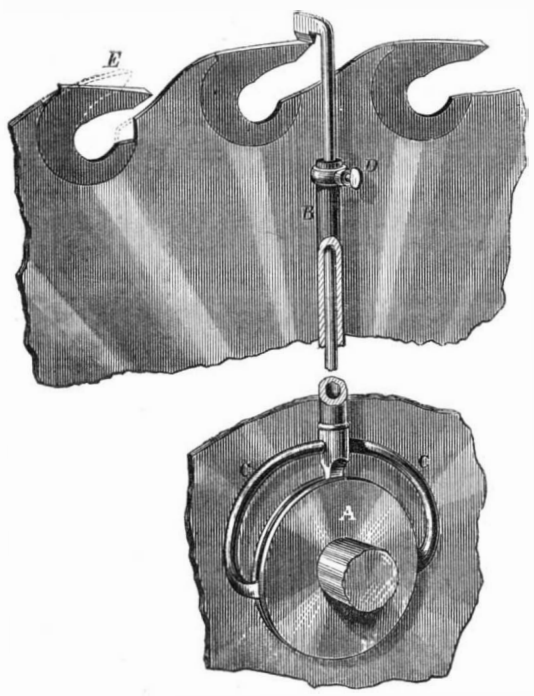
Further information may be obtained by addressing Wm. Einstein, St. Louis, Mo.

Bromide of Potassium.

Bromide of potassium still continues to attract the attention of the medical faculty. That it is a valuable therapeutical agent there can remain no possible doubt. Its action appears to be dissimilar from all other known remedies, and it cannot be classified upon the general principles adopted by most writers upon the materia medica. It promotes sleep without narcotism, controls excitement of the sexual organs, and is found in general to be a valuable remedy in functional derangements having their origin in reflex nervous action. Its action in such cases doubtless takes place in some mysterious manner upon the nerve centers. A very interesting and instructive treatise upon the power of bromide of potassium in checking the reflex nausea induced by the administration of anæsthetics, by Alex. J. Stone, M. D., of Boston, has made its appearance, and is a valuable contribution to the literature of medicine. Dr. Stone's method of administering this remedy in combination with narcotics in cases of delirium, or great nervous excitement, is worthy of notice, and will undoubtedly lead to other methods of prescription.

ADJUSTABLE INDICATOR FOR ROUNDING SAWS.

The engraving illustrates a new device for rounding circular saws, especially those which are run with the points of the teeth spread. By its use the practice of grinding off the



points of the teeth around nearly the whole circumference of the saw, to accommodate one or more teeth that may be a little too short, is avoided; for if it is known to the sawyer, before he begins to spread a tooth with the swage that it is too short, he can raise the point by means of the swage.

The engraving shows a section of Miller's Adjustable Teeth Saws with the indicator applied to a tooth to determine its length. A is the fast collar on the saw shaft. The indicator, B, is a pipe, or hollow shaft, having secured to its bottom end two forks, C, which, with the V-point of the hollow tube, engage with a score cut in the periphery of the collar, A. This score can be easily cut by a hand tool, if a rest is fitted for it near its circumference, and the saw shaft be made to revolve at a proper speed. This scoring of the fixed collar furnishes a seat for the lower end of the gage or indicator. The upper end of the indicator has a knife edge, which, when set to the point of a tooth, is held by the thumb screw, D. It is evident that the gage may be used to designate the circumference of the saw simply by turning the saw around, noting the difference in elevation of the points of the teeth. When saws with adjustable teeth are used, it is only necessary to turn the point of the tooth down to expose the shoulder, which may be filed away, as shown at E, with dotted lines, somewhat exaggerated.

Such a device is really valuable to practical sawyers to enable them to adjust their saws without the necessity of grinding off the edge by a fixed stone, and then filing up and swaging to gage. By this simple gage every tooth of a saw can be made to cut alike.

This device was patented on March 31, 1868, by W. P. Miller, Middletown, N.Y. They are manufactured and sold by Henry Seymour & Co., 52 Beekman st., New York city. Either of the above parties may be addressed.

An Alarming Theory.

From the annual recurrence of rains, meteoric showers, and the explosions of steam boilers in various parts of the country, Professor Loomis suggests a very uncomfortable theory in regard to the safety of the earth itself. He thinks it not impossible that sufficient steam might be generated in the burning center of the world to blow the whole globe to pieces. A volcanic eruption under the sea or near it, like that of Vesuvius now in progress, may at any moment convert the earth into a huge steam boiler, by letting the water in upon the central fires, to be followed, for aught we know, by an explosion that shall rend it apart, and send the fragments careering through space as small planets or meteors, each bearing off some distracted member or members of the human family, to make, perchance, new discoveries and new acquaintances in other parts of the planetary system now revolving with us. So that the final catastrophe may, after all, be only a boiler explosion on a magnificent scale of grandeur and destruction.—*Eclectic Mag.*

Stub Twist Gun Barrels.

A writer in the London *Quarterly Review*, in an article entitled "The Use of Refuse," gives currency to the old, and we had supposed exploded, idea, that old horseshoe nails derive their superior toughness by hammering upon the stones of the street pavements. He says: "The horseshoe nails are not mixed with the common cast iron, as they are much sought after by gunmakers for the purpose of making stub twist barrels. This is a roundabout way to get tough iron, it is true, and it remains as an instance of an improved product brought about by accident; it is like the Chinese method of discovering roast pig. Perhaps, following out this idea, some quicker and less laborious method of making cohesive gun barrels will be discovered than the banging of horses' feet upon the granite pavement."

There is no apparent scientific reason why the pounding of the ends of the cold horseshoe nails upon the stones of a wagon road, the mass of the metal meanwhile being incased in the elastic hoof tissue, should improve the quality of the metal. We incline to the belief that gun barrels made out of new horseshoe nails, originally of the same quality of iron, would be of just as good quality as though made of old nails, and we further express the belief that if the writere alluded to should investigate the method of manufacture oe the stub twist barrels, he would find that the "roast pig" has never been discovered in this instance, and that the majority of such barrels which are offered in market, are not made of iron accidentally refined in the manner indicated.

THE noise of cannon has been heard a distance of more than two hundred and fifty miles by applying the ear to the solid earth.

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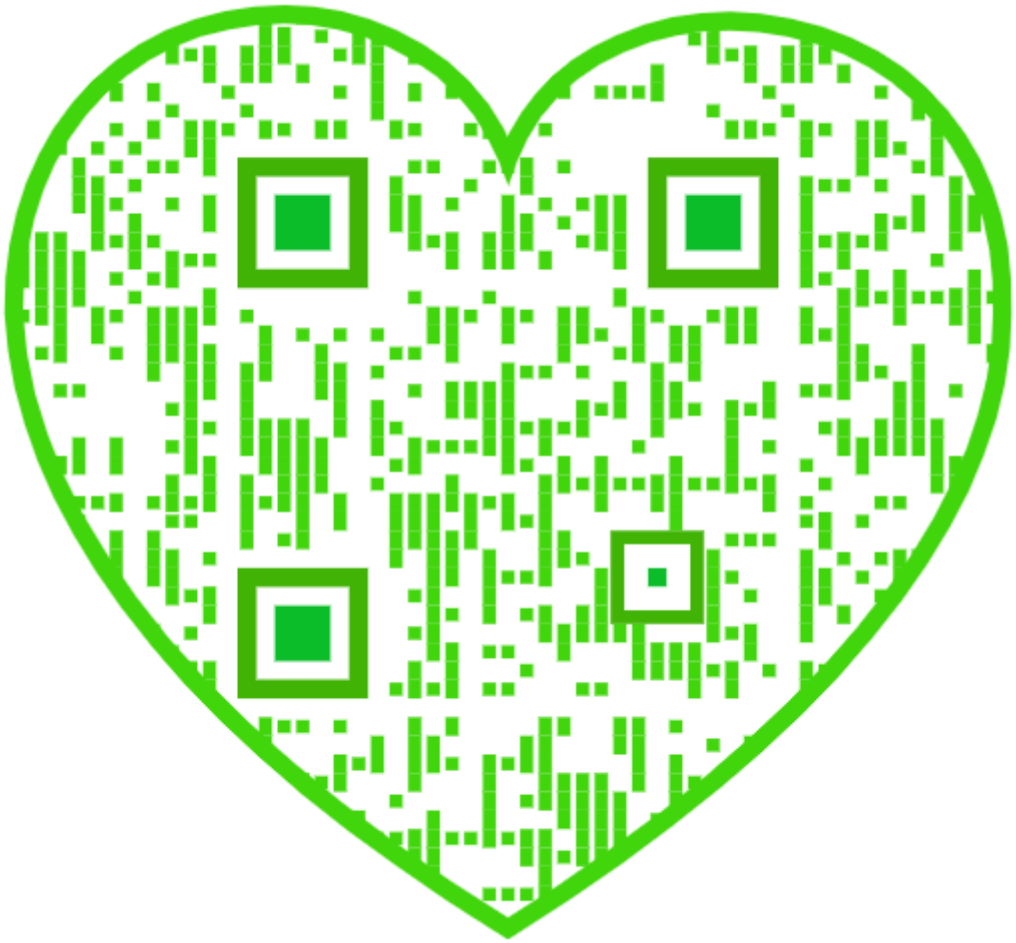


THE WATCH---ITS HISTORY AND MANUFACTURE.

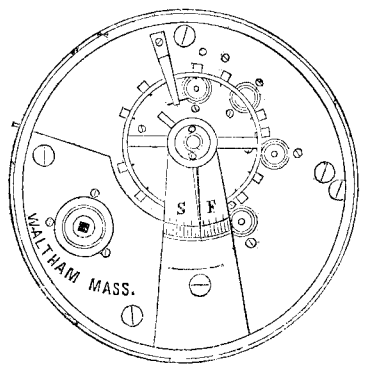
BY H. F. PIAGET.

No. 5.

LIST AND DESCRIPTION OF THE DIFFERENT AMERICAN WATCHES.

The American Watch Company, Waltham, Mass.

Its first quality Nos. 1 and 2 have been much improved lately, not only in the finish, but also in having the reversible center pinion, whereby the accidental breaking of mainsprings frequently causing bending or breaking of teeth in the wheels or pinions, and even jewels, is avoided, in having ruby jewels, visible pallets,and isochronal hair springs, which regulate with much more nicety than the flat ones.

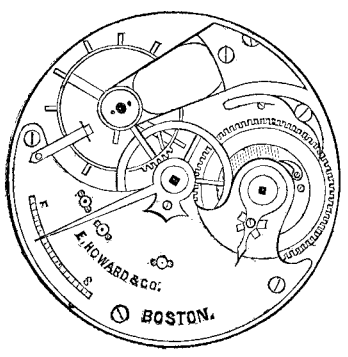


This company is also making some of its watches with pendant winders. I also notice a great improvement in its watches engraved "Waltham Watch Co." This consists in having stop works to the barrels, chronometer balances, and in having the hair spring fitted to a movable stud, so that they need not be unpinned to clean the watch, and the hair spring being above instead of below the balance, which my experience has taught me is better for regulating more accurately. This company has also introduced a new kind of watch, engraved "Home Watch," a cheap and serviceable article.

For the other kinds of watches made by this company see list of watch manufacturers.

The Howard Watch, Boston.

This watch I consider a good, reliable, and serviceable watch, much improved lately by introducing the patent barrel, which like the reversible pinion is a safeguard against breakage of teeth, etc. This watch is made of different qualities and prices. Its construction renders it quite a convenient thickness for gentlemen.



I understand they intend soon to make some smaller sizes. This it would be advisable to do, and by putting plain gold balances instead of the chronometer ones made at present, the watch could be made thinner and cheaper.

By present construction of this watch if the spring breaks, in order to replace it, the movement has to be taken entirely to pieces, so that it has frequently to be recleaned. If the workman is not very careful with the plates, etc., the oil spreading sometimes from the holes or pivots over the gilding, etc., occasions a slovenly appearance, and looks bad, particularly in new watches.

Nearly the same fault exists in the "American Co.'s" watch, although not quite to the same extent. In the "American Co.'s" watch the spring is hooked to the barrel, while in the "Howard" it is fastened to the main plate. I think that by altering their caliber this could be avoided. These watches are, I am informed, soon to be greatly improved by the application of quite a new patent regulator, also a new style of pendant winding.

The Tremont Watch, Boston.

This watch is a strong, good, and serviceable watch, it is a little thicker than the "Howard" watch, on account of having the balance in the center instead of the side of the plate. By its construction dirt or dust cannot be easily introduced in the works. The chronometer balances and escapements used by this company are made by American machinery in Europe, under the superintendance of Mr. Dennison, who, with Mr. Howard, many years ago, first originated the American system of watch manufacture. The watches of this company are made of two qualities, the first engraved "Tremont Watch Co.," Boston, and the second "Melrose Watch Co."

The National Watch, Elgin, Ill.

This watch has not been long in the market, but from what I have seen of it, I believe it will prove to be a good, strong, and serviceable watch, as it is thoroughly well finished. The hair spring is fixed in an improved manner, and the pinion is attached to the center wheel in such a way that the breakage of teeth, etc., in the train (from main springs breaking), is avoided. It is also made with full upper plates, like the "Tremont" and "Waltham" watches. The first quality, engraved "B. W. Raymond," with expansion balances, jeweled in every action, and properly adjusted, I think will prove excellent timekeepers.

The Keyless or Wadsworth Watches, Manufactured at Newark New Jersey.

There is a watch manufactory at the above place, where a very excellent watch is made, with an improved patented pendant winding and hand-setting arrangement. From what I have seen of it, I should say it would not be likely to get out of order. It is very simple in its construction. The movements are full upper plates, chronometer balances, well jeweled, and very nicely finished. I approve very much the whole getting up of the watch.

I should mention an improved feature in the Tremont, Melrose, National, and the Wadsworth watches, which is, that a new main-spring can be put in without taking the watch to pieces, and merely by unscrewing the bar which holds the barrel, effecting a saving of time in repairing.

I have not inserted engravings of the Tremont, Melrose, National, or Wadsworth watches, as the reader by looking at the one marked Waltham Watch, will see the general appearance of them all. The sizes of all the above named watches are the same, so that they will all fit the cases made for the 18th size Waltham, or Appleton, Tracy & Co.'s full plate watch.

I must here again warn the reader, that there are many imitations of American watches sent here from Europe, where they are manufactured much cheaper. Therefore be particular from whom you purchase, so that you are not deceived.

I would earnestly recommend all manufacturers of American watches, if they desire to make their manufactures permanent and lasting, and as they say "the best in the world," not to relax in the quality of the material and metals used, or in the finish of their movements (according to their prices), for if they do they will assuredly share the fate of the "Yankee Clocks," as the English call them.

Strive to be continually improving your works, and never make a watch without a stop work. Any kind will do, if made to stop at the center, and not at the end of the mainspring. Another suggestion is, to leave both the squares of the half plates, American and Howard watches, a little longer; for having the cases made without the movements, they are frequently below the caps, but if they were longer they would have a much better appearance. Make them as long as possible, for it is much easier to shorten than to lengthen them, the latter only being done by having new ones made; they would also be better for winding, and the squares and keys would last longer.

Let not an imperfect article leave your factories, if it can be avoided, particularly in fine watches, for if you do the English will keep the lead for large watches and chronometers, and the Swiss for the small and complicated ones. The latter people have been improving their work very much of late years, and will continue to do so if they are paid a fair remunerative price for their labor; for remember the Swiss, like the Americans, are a persevering, ingenious, and skillful nation, and if possible will not allow any other to surpass them in watch work.

There are so many in that country depending upon this business for support, that they are stimulated all the time to keep improving and perfecting their watches.

LIST OF THE PRINCIPAL AND MOST CELEBRATED MAKERS OF MOVEMENTS AND WATCHES IN ENGLAND, SWITZERLAND, AND AMERICA.

I think it will greatly benefit the purchasers of movements or watches, not only the storekeepers, but also the wearer, to know the names of the most eminent manufacturers who export watches from England and Switzerland, and those who manufacture in the United States. I have not included in the list many that I knew in London, who do not export for the trade, but sell their watches themselves to the wearers, such as Vulliamy, Arnold, Parkinson, Earnshaw, Barrauds, Brockbanks & Atkins, French, McCabes, Duncan, Dwerrihouse, Carter, Ogston & Bell, etc.; nor those in Paris, many of whom have their watches made in Switzerland, Breguet, Lepine, Le Roy, Oudin, Andemars, Bautte & Moulinie, etc. Some of the above original makers may not be living now, but their fame will last for ages, and persons who have genuine watches of these makers, although they may be old, if they have not been spoiled in repairing, will find them to be still good timekeepers.

I would, however, here observe that there are many importers and watch dealers in this country, who have their own names engraved on movements or watches that they sell, which are made expressly for them, either in England or Switzerland. In that case the buyer is almost always sure to get a good article, for no respectable dealer or storekeeper would allow his name to be put on an inferior watch, and such watches are made by makers on whom the dealers can depend for the quality of the works as well as the cases. I will therefore name those watches that are the most reliable, to my certain knowledge.

In London, the first quality made by Frodsham or Dent, claim the pre-eminence, but are very expensive, when genuine ones; next grade, the F. B. Adams, Guillaume, E. D. Johnson, Dixon, T. F. Cooper, Stoddard, Hoddell, David Taylor, B. J. Warner, Morris, Tobias, etc.

In Liverpool, Roskells, M. T. Tobias & Co., R. & G. Beesley; their 2d quality have the name of Jas. Blundell on them. Harrison, Sewell, Joseph Johnson, 25 Church street, Liverpool, which was, and I believe is still M. T. Tobias's 2d quality; of these and the Beesley watches there are, perhaps, more bogus ones made than of any other English makers.

There has not been, that I am aware of, for over thirty years, a watch maker of the name of Joseph Johnson at 25 Church street, Liverpool. From all the information I can gather, after his death, the firm of M. T. Tobias & Co. purchased from his heirs the right to put his name on their 2d quality movements. Their 3rd quality have the name of Frederick Spears. I do occasionally have an original Joseph Johnson to repair, yet the imitation is so close (although the quality is very inferior) that it is difficult for an inexperienced hand to detect the difference, unless they are too common; this is also the case with the imitation Beesleys.

American Watches.

The American Watch Company, Waltham, have several kinds, qualities and sizes, for ladies and gentlemen, some full and some half plates. Those engraved American Watch Co., are their first quality; they are fine articles, but, like the Frodsham, expensive; 2d quality is engraved Appleton, Tracy & Co., 3d, Waltham Watch Co.; 4th, P. S. Bartlett; 5th, Ellery, and 6th, Home Watch.

Howard Watch, Boston. These are made of different grades of quality, and are still improving.

Tremont Watch Co., Boston. Their 2d quality is engraved Melrose Watch Co., Melrose.

National Watch Co., Elgin, Ill., have at present six different qualities. The 1st, engraved, B. W. Raymond; 2nd, Culver; 3rd, H. Z. Culver; 4th, J. T. Ryerson; 5th, G.M. Wheeler. 6th, Mat. Laflin. All have Elgin, Ill., on them. Other styles are in progress of manufacture.

The Keyless Watch, American pendant winders, and other movements, manufactured at Newark, N. J., have the name of Wadsworth engraved on them.

Of Swiss watches their names are legion, but I will only name some of the principal and most reliable makers: Jules Jurgensen, Copenhagen, fine watches, but like the Frodsham, expensive. His 2nd quality have the name of Lavalette, Locle, on them, James Nardin, Locle; H. L. Matile, Locle; Richard, Locle; Favre & Andrie, Locle; Favre, Leuba & Co., Locle; Vacheron & Constantin, Geneva; Breitling, Loederich, Chaux de Fonds, H. Bock, Locle; Borel & Courvoisier, Neufchatel; Perregaux, Locle; Beguelin Houriet, Tramelan; Mathez Freres, Tramelan; Ch. Horrmann & Co., Neufchatel; Lutz Brothers, Locle, etc. There are other good makers both in England and Switzerland, but I trust that I have enumerated a sufficient number to choose from, and these can be depended upon for the quality and the good performance of their works. The make of the above manufacturers varies as to style and quality to suit the most fastidious.

Yet I must here mention that their own names are always engraved on their first quality, unless they manufacture for others: still, if you buy a movement or watch with other names on than the above list mentions, and the person selling it recommends it, I think you need not fear being cheated, for I hope and presume that no respectable dealer or storekeeper would stake his reputation on the value of a watch.

I speak of all these makers from my long practical experience with the quality and make of their works, having had some of each kinds through my hands to examine, repair, or clean. Yet I must again impress on the minds of the inexperienced in the trade, as well as the public, wishing to obtain any of the above makers'—get them of reputable parties, of those on whom you can depend to get the genuine names and goods, and not imitations or bogus ones, as there are many in the market. Some may have been foisted upon the inexperienced, although honest dealers, by reason of their not being able to detect the difference which it is in many cases difficult to do. I believe that few can detect the difference between the genuine and the counterfeit watch unless he has worked in the factories of England for English, those of Switzerland for Swiss, and those of the United States for American, and are or have been practical workmen themselves.

No matter how much my fellow craftsmen may disagree with me in some of my remarks, they will, I am convinced, acknowledge that in this last I am right.

THE FOLLY OF PUTTING FICTITIOUS NAMES ON WATCHES.

The Swiss made a great mistake many years ago, and I am afraid it is still done occasionally, that is, putting English and fictitious names upon their watches, instead of their own. Had they not done so the really good makers would have been known in America long before this, and they would not have lost so much of their trade, which I am sure they will agree with me in saying that they have done.

I do not mean to say that although these watches bore false names they were not good watches. I will admit that some of them were very good; still it was wrong and a fraud on the public; and according to my ideas of honesty, quite culpable. It deserved not to prosper, and it did not.

By continuing this practice for several years, and to a great extent, their work was condemned, and they were stigmatized as impostors and cheats, so that their watches, at least many of them, were looked upon as disreputable pieces of workmanship, and the Swiss very nearly lost their American trade and the reputation of being an upright nation; although until this quackery was exposed they had enjoyed the people's confidence, but afterwards they became afraid of the Swiss watch. By many it was done innocently, they thinking it was all right so long as they received the orders to execute them, not thinking of the consequences during the time their wares had a good sale. Some, however, of the most respectable manufacturers, both in Switzerland and England, would not receive orders in that way; but if an order was given they would engrave the watch or case, made by ——— for ———, giving name and place where made, leaving it to the honesty of the parties selling it to properly represent it.

I am glad that they have at last awoke to the necessity of having a good name and of maintaining it.

Although I do not claim to be a prophet, yet over thirty years since I said the day would come when the Swiss would repent this to their cost, and I find my words have come true, and they now see the mischief and folly of it.

The plan that I suggested was, that they should put their own names on the watches they knew to be good, and on watches of inferior quality, such as they could not recommend, no name at all, or if they wished to have them engraved, give the proper description, and not "Patent Detached Levers," or "Full Jeweled," on common Lepines, and even Verge watches. But by persisting in this they were encouraging and supporting a system of cheating traffic, which they must have known was absolutely wrong.

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I am sorry to say that at the present time the deception is still practiced of engraving false names on their imitations of American watches. But if they were to engrave them in this way: American Caliber or Style—then put their names if they wished, or leave them blank, I believe it would be more honorable, both for the maker and the dealer; and although some may make money by the operation, I do not envy them their gains.

In England this fraud was not carried to such an extent, yet it was and is still done in many instances, by putting the names of good makers on very inferior watches. In both countries the laws against this is very severe: yet the unprincipled find means to evade the law—and throughout the world men are found who value money better than good reputation. The Swiss are now, as the saying goes, "being paid back in their own coin," for many who first induced them to do this wrong are now trying to injure their manufactures, by giving them a bad name; and they will take time to regain what they have lost, but it can and I trust will be done. My Swiss readers must forgive me if I am too severe. But although myself and my descendants are now Americans, yet Switzerland, my native land, with all thy faults I love thee still, and if thou errest I must tell thee, for my idea is, that to prosper in this world, and to have no fear of the next, one must act on the square towards all men, and be willing to be judged by our deeds.

The reader, I think, must allow that although born in Switzerland and educated in England, I speak plainly and impartially, and I always intend to do so when I see a wroug done, but I desire not to offend any one. If any feel themselves aggrieved, to them I say, we had far better appear what we are than pretend to be what we are not.

Watches whose cases open at the back by a spring are not so secure and free from dust as those with a proper snap, which can be made to shut close and open easily; springs are only necessary for wearers whose fingers are particularly soft, or to raise the covers of hunting watches.

Hunting watches have a cover to protect the glass, and it will do so when sufficiently thick and convex, but very flat hunters neither admit of the necessary shape nor thickness; in many that are now made, particularly Swiss watches, the glass is nearly as liable to be broken from pressure as it was when unprotected, and the difficulty of procuring another is much greater. When flatness is necessary, an open-faced watch should be preferred, with a number of spare glasses, which a very little practice will enable any wearer to put properly in their place.

In giving advice with regard to choosing a watch, I have said nothing but what every good watchmaker or importer of good watches will acknowledge to be the facts.

I have divested myself of any prejudice or partiality, and have only related what I have learned by practice, and the experience of forty years, and which I have endeavored to explain plainly, without any technicalities.

I will now endeavor to be more explicit, and give my reasons. For a large thick or a three-quarter plate chronometer, duplex, or lever escapement, properly compensated watch, with a fusee and chain, the English certainly claim the priority, they having been the first to apply, and from the great practice and attention given by them to, compensation.

The American watches being more simple in their construction, and easily repaired in case of accident, claim the next notice.

For a thinner or smaller watch, the Swiss must have the preference, as it is nearly the only kind of watch made there, and other reasons explained in a former part of this article. There is, in Geneva, a celebrated manufactory wherein nothing but good watches are made, and it is well known to most of the best stores in the United States; every part of the watch is made in the same establishment. I have had considerable practice with them, and I have generally found that they are the most perfect that I have had in my hands.

I do not pretend that there are no bad English watches made; quite the reverse. I have always found that a bad English watch was worse and more difficult to put in good order than any other.

For an ordinary or cheap watch, I should prefer a Swiss one, they having the facilities to manufacture cheaper than any other nation. Fine Swiss watches are made as correct and as accurate as it is possible to make them for the size and thickness, but the prices will not be less than for the English ones, although the style will be different. Common and cheap watches will of course always be made to keep pace with competition, and as an article of trade. I do not intend to explain their defects, I only endeavor to point out the merits of a good one.

In my next, I will give such instructions as I can to keep it good, and it may possibly be the means of saving the reader some unnecessary expense, if he will take the trouble to peruse these articles throughout, as well as save us from being often erroneously blamed, however honest and square we may do our work.

ON MUSICAL AND SENSITIVE FLAMES.

Abstract of a Lecture delivered before the Dublin Royal Society, by W. F. Barrett.]

One of the earliest natural facts which arrest the attention of a thoughtful mind is the stability of the wonderful universe in which we live. This permanency is, nevertheless, the product of incessant change; for nothing is absolutely at rest. The secret of the stability of nature, its unresting repose, is found in the fact that the motion is regular—the change is periodic. Atoms, as well as planets, have their period of revolution. Hence, sooner or later, in the physical world at any rate, phenomena repeat themselves. Like a vast living body the throbbings of the universe announce the accord of its varied parts. This rhythmic flow of nature constitutes most literally the "Music of the Spheres." Not this, but a less ethereal music, I have had the honor of being invited to bring before you this afternoon.

The so-called musical or singing flames were discovered nearly a century ago by a native of this city, Dr. Higgins, who found that, when a flame of hydrogen was burning within a glass tube, the flame emitted a musical note. The experiment was repeated; and it was moreover shown that glass tubes were not necessary, for similar sounds, though of different quality, were produced when metal or pasteboard tubes were employed. Neither was it necessary to use hydrogen, for a small flame of common coal gas gave a musical note when burning within a tube.

The cause of this phenomenon had been investigated by many, but most successfully by an illustrious man who had lately passed from among us—a man who has left behind him a name as good as it was great, and who possessed a mind as simple and child-like as it was sagacious and profound—the late Professor Faraday. This subject had been one of Faraday's early *flames*. The cause was shown to be due to the fact that the gas, in issuing from the burner, did not burn silently. It rustled in passing through the orifice of the burner, and in burning it made a continuous series of inaudible explosions. This was proved by several experiments, for, by suitable means both these causes could be exalted so as to become sensible. The resonance of the tube placed over the flame renders audible all the sounds of a certain pitch made by the gas. By a series of experiments it was then proved that any noise, if made regularly and with sufficient rapidity, was converted into a musical note. Thus rough and rude taps, and hard and harsh explosions could be chased into perfect melody by mere rapidity of succession.

The condition of the flame when burning within the tube was shown by a moving mirror. It was seen that when the flame was silent, and the mirror moving, a band of light was produced; but when the flame was sounding, this luminous ribbon was broken up into a series of disjointed images of flame. The effect of lengthening the tube in which the flame was burning was next shown, and a series of gas jets burning within glass tubes of varying length gave a corresponding series of musical notes of varying pitch. By placing the finger upon the top of these tubes the sound could be quenched, and thus a novel musical instrument could be constructed. From glass tubes the lecturer passed on to show the effects of flames burning within extremely long tin tubes. Within a tube six feet long, and about one and one-half inches in diameter, the flame of a large gas burner gave a loud unmusical roar. By adding to the end of this tube a glass chimney, it was seen that when the flame was sounding it was broken up into wild confusion. By enclosing a still larger gas flame from a huge Bunsen's burner within a tube 18 feet long and three inches in diameter, a deep roar was obtained intermingled with loud reports similar to the discharge of musketry.

Returning once more to the gentler music of the small glass tubes, two flames, enclosed in their respective tubes, were taken and made to emit notes of the same pitch. This point was gained by shifting to and fro a paper slide, which moved stiffly at the upper extremity of one of the tubes. When the notes were nearly in unison a series of intermittent sounds or beats were obtained, due, as is well known, to the mutual extinction at certain intervals of the two sounds. Corresponding beats were obtained from two organ pipes and two tuning forks nearly in unison. One of these tuning forks, mounted on its resonance case, being silent, the other, unmounted, was now struck, and its prongs brought near to, but not touching those of the first fork; at first no sound could be heard, but by degrees the unmounted fork transferred its motion to the mounted one, and the sound of the latter slowly welled forth. The sound of the voice can thus be transferred to the strings of a pianoforte, and in the same way a flame can be made to accept and resound to a note of the proper pitch. This was illustrated as follows: A singing flame, by adjusting the paper slider, was tuned to the note of a certain fork; the tube was then raised slightly, so that the sound could be quenched by momentarily placing the finger on the top of the tube. On now striking the fork, and holding it over a resonant jar, the flame instantly started into song. The same effect was shown by the syren, and also by the human voice. Retreating to some distance from the flame, the latter could be made to respond at pleasure, by pitching the voice to the proper note, whilst it remained utterly unaffected by any note not in unison with itself. Musicians would find such a flame a faithful monitor in training the voices of their pupils.

In the last experiment we have really a *sensitive* flame; but this name is now applied to another discovery, which was made in another manner: Two years ago (December, 1865), while engaged in some acoustic experiments, the lecturer had observed that every time a shrill note was produced, a tall tapering gas flame in his vicinity was singularly affected; the flame shrinking every time the note was sounded. That observation led to further experiment and inquiry, the result of which has been the discovery of the conditions of success for obtaining flames sensitive to the slightest sound. Some month after the above observation, Professor Tyndall took up the subject, and having largely added to its interest and importance, offered an explanation of the phenomenon in a lecture delivered at the Royal Institution, in January, 1867. At this lecture the discovery was first published, and the name given to "Sensitive Flames." Subsequently the lecturer had proposed a fuller explanation, and had discovered that not only flames, but all gases could be rendered extremely sensitive to sound, the track of the gas being marked by mixing it with smoke. This historical notice would be unjust without referring to an observation made ten years ago in America by Professor Leconte. That physicist had noticed that certain sustained sounds in an instrumental concert caused a very susceptible movement of the ordinary gas flames in the room. This observation is really the germ of the more wonderful effects afterwards independently discovered by the lecturer. Though Professor Leconte was the first to publish the fact, in 1838, it appears that, previous to this date, artisans had frequently noticed the phenomenon as resulting from the shrill sounds of their work; and several musicians have informed the lecturer that the same effect has been one they have commonly observed.

Turning now from scientific history to experiment, the lecturer showed various kinds and degress of sensitive flames. First, a "batswing" flame, which, under the ordinary gas pressure, moved slightly at the sound of a whistle, but thrust out long tongues of fire when the pressure was increased by urging the gas from a holder. The increased pressure was always necessary to obtain the more sensitive flames, for a reason that will be understood directly. A jet of gas, issuing from a V-shaped orifice, was shown to be quite insensible to sound until the flame reached a hight of ten or twelve inches, and then, at the sound of certain high notes, the flame shortened and spread out into a fan shape. Whistling to this flame in one key had no effect, while in another the effect was very marked. Playing an air upon a so-called bird-organ, the flame selected the high notes, and promptly shortened at their recurrence.

The probable cause of the sensitiveness of these flames was then alluded to. The impact of air evidently had nothing to do with the phenomenon. This was strikingly shown in the following experiment: By tapping a membrane stretched over the mouth of a large tin funnel, a puff of air could be driven with such force from the narrow extremity that a candle was easily extinguished some twelve feet away. Directing this puff of air against the sensitive flame, it was seen that the flame moved violently, but was utterly unaffected when the puff was driven either to the right or left. This should also be the case if in former experiments it were the impact of the air, and not the sound, that produced the effect. But it was at once seen that when the lecturer whistled, at the same time slowly turning round, the flame still continued to shrink, and was almost as powerfully moved when the back was turned to the flame. The effect, then, is solely produced by the wave-like to and fro motion of the sonorous pulses. As first indicated by Professor Leconte, a gas flame, to be sensitive, has to be brought near its point of roaring; it then stands, according to Dr. Tyndall, as it were on the brink of precipice, over which the sound pushes it. Agreeing with this explanation, that a sensitive flame is a body in a state of unstable equilibrium, the lecturer supplemented it by comparing the flame to a resonant jar; the flame, as was proved by a moving mirror, being in a state of rapid isochronous vibration when under the influence of external sound. The actual shrinking of the flame was due to an increase in the velocity of the current of gas, which was possibly brought about by an external sound throwing the pipe that conveys the gas into a state of vibration, which would thus narrow the channel of the gas passage; the change in the aspect of the flame being largely modified by the shape of the burner.

Whatever may be the complete explanation of the phenomenon, there can be do doubt that in a somewhat similar manner other objects besides flames are also sensitive to slight external impulses. Thus, many chemical compounds, as, for example, fulminating powders, are in a state of unstable equilibrium. The so-called "Rupert's Drop," which, when scratched, flew into a thousand fragments, is another instance of this kind; and some of the most eminent physicists are inclined to believe that the surface of our sun is in a somewhat analogous sensitive condition. From inorganic things we may travel on to organic, for we have evidence that there also exists, in organized structures, a more or less sensitive state at certain times. Thus, our wonderfully complex bodies, by disease or nervous derangement, are often thrown into an abnormal state, and when in that condition are sensitive to the slightest stimuli, if of the proper kind. This may possibly be the foundation for whatever truth there is in the science of homeopathy, the body being sensitive to a feeble influence, similar in kind to the disease under which it is suffering.

Here some may ask: "Of what good are these speculations, and to what practical end can these experiments be turned?" This observation, permit me to remark, is wholly improper. There is something nobler in life than the accumulation of wealth, and a higher end to experiment than its mere monetary value; for all accession to knowledge must finally benefit the world. This ever intrusive exclamation, *cui bono*, is a serious check to the advancement of knowledge, for it disheartens those who are making nature yield up her secrets, and it damps the ardor of every searcher after truth. Allow me to illustrate my meaning. Imagine that when enchanted by the performance of some well-executed opera or oratorio, a companion by our side were to say: "Well, after all, of what good are these fine sounds; to what practical end can you turn this music?" Should we not instantly condemn a speech so characteristic of a sordid and sensuous mind? And when the student of nature is listening with admiration and even awe to the sweet, though silent, music sung to him by every object of his diligent study—by air and water, by flowers and flowers—he is conscious that he bows before an oratorio as far above that of Handel as the works of the Creator are superior to the composition of the creature.

Still, however, the lecturer was enabled to show a practical application of these sensitive flames. Attention was drawn to the fact, that the flame shortened and spread out laterally

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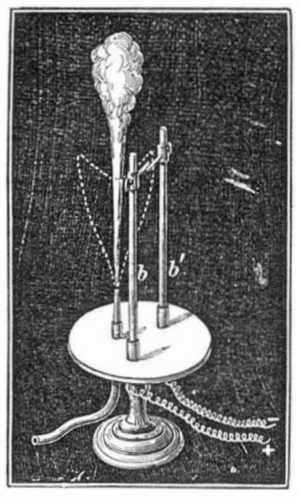
under the influence of a whistle. Advantage was taken of this peculiarity to construct an instrument which may be turned to some practical use. The instrument consists of two sliding brass rods, *b b'* (see diagram), attached at right angles; to the summit of one is a compound metallic ribbon, consisting of thin layers of silver, gold, and platinum, welded together. This arrangement expands unequally by heat, by so doing it swerves aside, and is thus brought into contact with a platinum point projecting from the top of the second brass rod, which is fixed about half an inch from the free extremity of the compound metallic ribbon. Connected with the two brass rods is an electric battery, associated with which is an electric bell, placed in a far distant part of the room. The bell will immediately ring if the electric circle be complete, but at present there is a gap in the circuit between the metallic ribbon and the platinum point. "I now ignite," said the lecturer, "a sensitive flame, which, in its ordinary state, burns at about two inches from the compound metal ribbon. I retreat some thirty feet from the flame, and whistle; the flame at once responds; it shrinks and spreads out sideways. By so doing it comes in contact with the metal ribbon; the latter instantly springs aside at the warm touch of the flame, strikes against the platinum point, completes the electric circuit, and there you hear that distant bell answering me every time I whistle." In the same way, at any hour of the night, the crying of a child in its cot would automatically announce itself in its parent's room. By a somewhat similar arrangement, using, however, a different burner, a burglar filing the iron-cased doors of a jeweller's shop could be made to sound an alarm bell; and it is even possible, by making use of the propagation of sound through water, the reflection of that sound through a trumpet immersed in the water, and its conduction to a sensitive flame, shut out by non-conductors of sound from the noises on board ship, that an arrangement might be constructed by which the approach of a vessel in a fog might be detected by ringing a bell in the captain's cabin. It is not, however, my province to develop such inventions. With diffidence I throw out these suggestions, which may, I trust, by the practical mind be in some way turned to the public good.*



The lecturer had reserved for the conclusion a flame wonderfully sensitive to the slightest noise. The burner which gave this flame was formed of steatite, and consisted of a single circular orifice, through which the gas was forced from a large holder in the lecture room, with greater pressure than could be obtained from the main. The flame was now fully two feet in length, and observe, said the lecturer, how delicate and fragile a thing it appears to be, for at the slightest noise it drops down a foot.‡ The jingling of this bunch of keys, the crumpling of this paper, the dropping of a small coin, are more than sufficient utterly to break up its hight and symmetry. This flame makes no response to the vowels, O, U, nor to the labials, but it energetically responds to the sibilants. Repeating the stanza—

"Roll on, O rill, for ever!
Rest not, lest thy wavelets
Sheen as shining silver—
Shrink and sink to darkness."

The flame is unmoved by the first line, but emphatically bobs at the sound "rest" and "lest," and admirably suits its action to the words of the last line, for, when shrinking, the light of the flame almost disappears. So sensitive is this flame, that even a chirp made at the far end of the room brings it down more than a foot. Like a living being, the flame trembles and cowers down at a hiss—it crouches and shivers as if in agony at the crisping of this metal foil, though the sound is so faint as scarcely to be heard; it dances in tune to the waltz played by this musical box—and, finally, it beats time to the ticking of my watch. How wonderful are all these facts! And the more we know of them the more wonderful do they appear, for this astonishing change in the aspect of the flame is produced by an infinitesimal portion of those almost inaudible sound waves, already enfeebled by their distance, from the flame. Looking back on these, and innumerable other wonders revealed by physical science, and looking forward on that vast region which remains to be explored, do we not feel ourselves sinking to utter insignificance by contemplating the mysteries by which we are surrounded, while at the same time are we not conscious there is that within us still more wonderful than that without—a consciousness which lifts itself above all phenomena, grand and mysterious though they be?—*London Chemical News.*

* Several of the laws of acoustics may be illustrated to a large audience by means of the sensitive flame next to be described. Placing, for example, a watch in the focus of one concave mirror, and a sensitive flame in the focus of a distant second one, the reflection and convergence of sound is seen by the regular beating of the flame to every tick of the watch. The decay of sound, and the prevention of that decay by tubes, can also be shown in a similar way. Many other illustrations of acoustical phenomena at once suggest themselves. I hope shortly to publish some further applications of this novel *phonoscope*.—W. F. B.

‡ It is easy to see how a modification of the instrument just described can be, and has been, applied to this flame. The diminution of heat, arising from the falling of the flame can cause the compound ribbon now placed above the flame to recoil upon the other battery connection; or, another arrangement may be employed, an air thermometer having a bent stem, in which are sealed asunder platinum terminals; the circuit being closed by the backward movement of mercury in the tube, owing to the contraction of the air in the bulb.

ARAGO has demonstrated that the duration of a flash of lightning does not exceed the one-millionth part of a second.

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Do We See the Sun as Soon as it Rises?

MESSRS. EDITORS:—In the number of your paper for May 2d, I notice an article on the theory that, as "it takes light eight minutes to come from the sun to the earth, we do not see the sun until that amount of time after it rises;" or what is the same thing, we always see it eight minutes of time, or two degrees of space, behind its real position in the heavens. The writer denies this theory, leaving out of the problem refraction and other disturbing elements, and invites your readers to its solution.

Now if the sun's motion through the heavens was real this theory, that it is not seen as soon as it rises, would be correct, for, while the ray projected from the sun is traversing the distance between the sun and the earth, the sun continues to move on in its orbit, and, as an object is seen in the direction from which the ray enters the eye, an observer on the earth would see the sun in the position where it was when the ray left, namely, two degrees of space or eight minutes of time behind its real position.

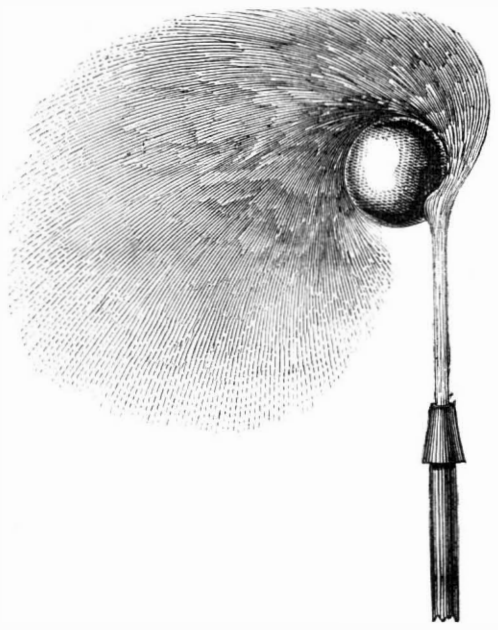
But in attempting the solution of this problem it must be distinctly borne in mind that the motion of the sun through space is only apparent—it is stationary—its apparent motion being caused by the rotation of the earth on its axis. Now, it takes light eight minutes to reach the earth from the sun, and in that time an observer is carried forward by the rotation of the earth two degrees. It is evident, then, that in order for a ray to make an impression on the retina of an observer's eye, it is only necessary for it to be projected from the sun towards a point two degrees in advance of him (just as a sportsman, in order to hit a bird on the wing, must shoot a certain distance in advance of it), and he, glancing along the ray, which has advanced towards him in a straight line, will see the sun in its real position, it having remained stationary.

CHAS. T. PLATT.

Cheyenne, D. T.

The Ball and Jet.

MESSRS. EDITORS:—When a ball is brought in contact with a vertical jet of water, the water will follow upward around



the curvature of the ball, by its adhesion, and be thrown off in tangents on the opposite side. It is a well established principle in hydraulics, that there is always a reactionary force exerted in a direction opposite to that in which the water is discharged. This force has a tendency to carry the ball horizontally, in the direction of the jet. Should it be such as to carry the ball over to the opposite side of the jet, then the direction in which the water will be discharged, with its reactionary force, will be reversed; the obvious tendency being to bring the center of the ball over the center of the jet. That this is the true disposition of the water can be ascertained in a moment by any one, by putting a ball of any kind on the point of a knife, and holding it in varying positions over an ascending jet of water; and I think it explains all the phenomena connected with the ball and jet question.

To show that it is not the rotation of the ball which enables it to maintain its position, take a tube bent in the form of a blow pipe, with which a light ball may be sustained by the breath. By piercing the ball with two minute fibers of wood or bristles, placed at right angles to each other, its movements can be distinctly seen, when it will be found to rotate at different times in a horizontal, in a perpendicular, and in an inclined plane. Sometimes it will rotate rapidly, at other times slowly, and at times it will remain poised on the jet for a considerable time, almost entirely motionless. These facts are incompatible with the rotary theory.

To show that it is not the inward rushing currents of air that sustain the ball, as suggested by your correspondent on page 291, suspend a ball by a thread from the ceiling, and bring the jet gradually toward it, when it will be seen that there will be no perceptible effect till the jet touches the ball. Other similar experiments may be tried which will do away with many of the theories that have been advanced, which only tend to muddle the problem, instead of making it clearer. The accompanying engraving illustrates these remarks.

F. G. FOWLER.

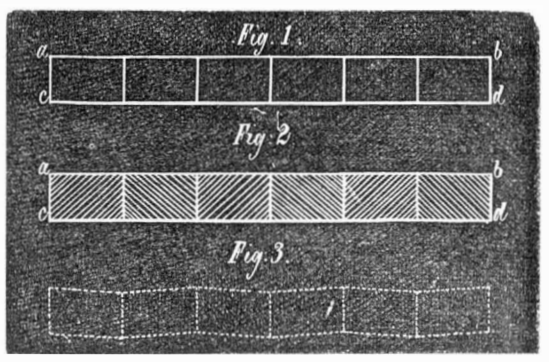
New York city.

Optical Illusions.

MESSRS. EDITORS:—The optical illusion to which you alluded on page 292, current volume, reminds me of another singular illusion, which may be of interest to your readers.

In the accompanying diagrams it will be seen by measurement that the lines, *a b*, and *c d*, are parallel, and the included space is divided into equal rectangles, the lines appearing in Fig. 1, as they really are, straight. But now let the surfaces of each of these rectangles be covered by a system of fine, equidistant lines drawn parallel to the diagonal of each separate rectangle, alternating the direction of each set of lines in the alternate rectangles, as in Fig. 2, and the optical illusion illustrated in Fig. 3 is observable at a glance.

By experiment it will be seen that the flatter, or more nearly horizontal the "hatched lines"—as they are technically termed—the more apparent will be the departure of the lines, *a b*, *c d*, from right lines, and the nearer the hatched lines approach the perpendicular the less observable will it be, until finally, reaching the perpendicular, the illusion disappears.

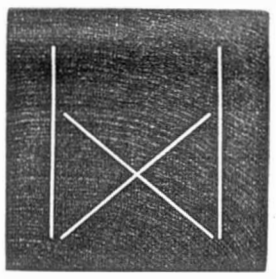


The reason of this is evident. The eye naturally seeks to follow the direction of the hatched lines, rather than that of the including boundary lines, and hence, as their lengths really increase and diminish regularly, and their directions really alternate, the mind unconsciously and involuntarily considers each rectangle separately, and sees in it not a rectangle but a rhomboid, the result of which is to apparently divert the direction of the lines, *a b*, *c d*, producing not straight lines but indented ones, as in Fig. 3.

J. A. J.

Newport, R. I.

MESSRS. EDITORS:—In No. 18, of your journal, a correspondent endeavors to explain the optical effect which my diagram previously published was made to indicate. This he does by saying that an additional length is given the perpendicular bar by the horizontal one being laid across its top. It needs a more satisfactory solution than this. For proof, take two bars, equal in length, one black and the other white; or at least, bars of different colors, and place them in rotation to each other as the figure represented, and the seeming disparity will still remain just as discernable as before. The eye, in this case, cannot unconsciously add the thickness of the horizontal bar to the length of the perpendicular.



I present above another diagram, wherein the lines of comparison have no contact with each other. The four lines are exactly equal in length, yet there is a great apparent difference. I doubt whether it is possible for any person to group mere straight lines, or bars, in any other manner, to show such a seeming disparity as appears in this. It is worth trying, merely for pastime, if nothing more.

J. HERVA.

Rockford, Ill.

Improvement Needed in Railroad Management.

MESSRS. EDITORS:—I beg leave to call the attention of the public, through your popular journal, to a fact which probably is but little known, viz., that nine tenths of all the accidents which happen on railroads, and much of the discomfort which arises from railroad travel, might be avoided if the companies would adopt many of the self-evidently valuable improvements, the work of skilled inventors, which have recently been patented in the United States. For instance, I lately saw in Chicago, on exhibition, an invention whereby a train would be saved from the destruction often caused by a broken rail. It had been submitted to many railroad men, who, while admitting its value, declined to adopt it. Again, the interior arrangements, with reference to seats, warming, etc., have been to a great extent unchanged from what they were twenty years ago, solely, I presume, because railroad companies are jealous lest some inventor should make a few thousands out of them. I am very familiar with a gentleman who has a perfect plan of warming cars, in which there is no danger from upsetting stoves and firing cars, and by the use of which every passenger would have warmth and comfort, but who will not take out a patent therefor lest railroad companies should refuse to adopt it. Has the community no interest in these matters?

J. B.

Patent Office Illustrations for 1868.

We learn that the contract for engraving the illustrations to accompany the next Report of the Commissioner of Patents has been awarded, by the joint committee of the two Houses in Congress, to Jewett & Chandler, of Buffalo, N. Y., the same firm who have executed the work for a number of years past. Inventors will be pleased to know that the standard adopted for the execution of the work will not be lowered, but will maintain the same excellence of character as heretofore.

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Improvement in the Construction of Bedsteads.

The full advantages of the bedstead shown in the accompanying engraving will not be seen without attention to the description. It seems to combine a number of the excellencies of several which have been proposed or put in actual use. First, the frame—side and end bars—is a whole. Second, the slats do not rest in recesses formed in the side or end bars, which are perfectly smooth, offering no retreat for vermin; and, third, the posts or standards can be removed from the frame simply by slipping them out of the metallic sockets at the corners of the frame.

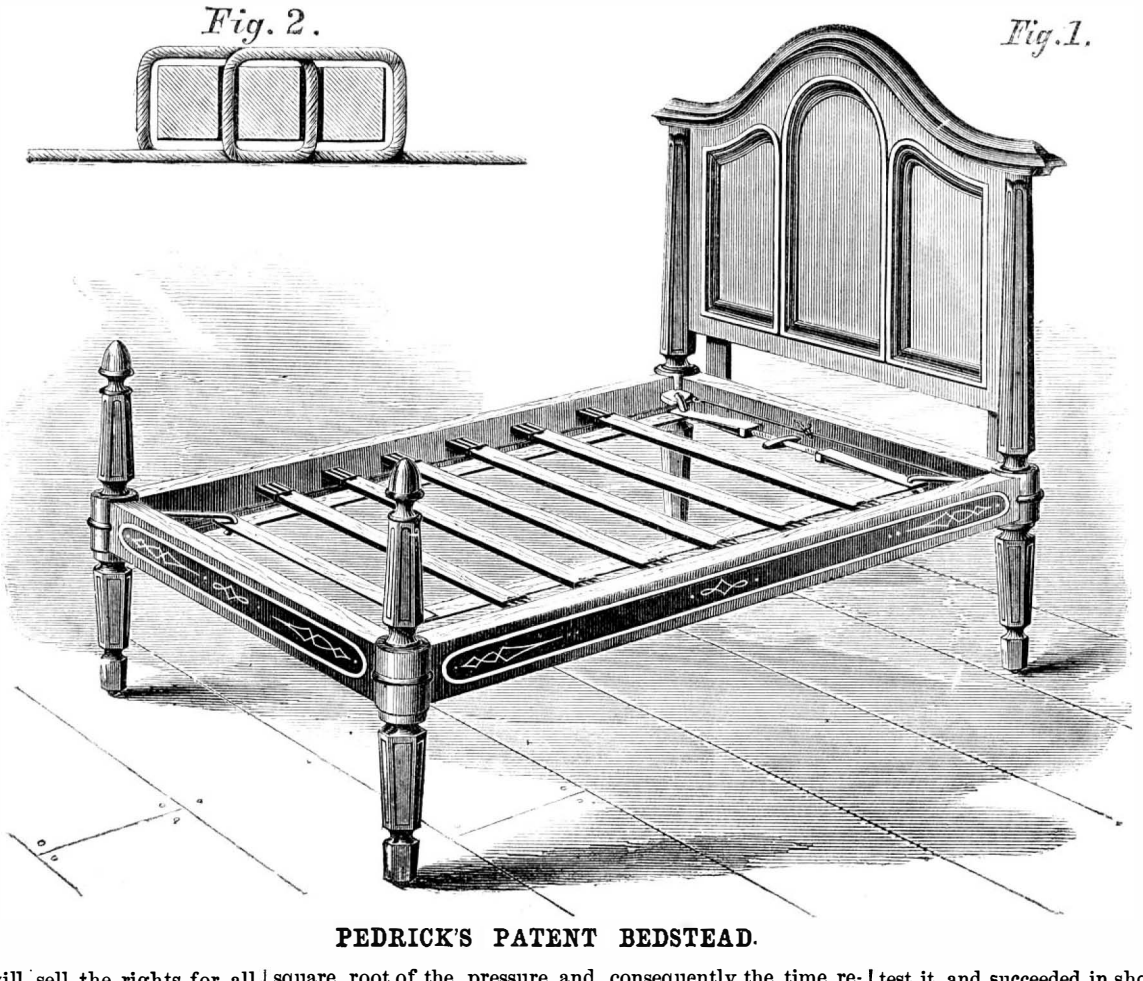
Inside the rails is a suspended frame, preferably of sheet metal, held to the corner sockets by means of double hooks engaging with V-flanges on the sockets passing through slots in the ends of the bars and projecting inside the bedstead, and also with holes in the frame that supports the slats. At one end or both, if required, a swivel nut engaging with the ends of the slat-supporting frame is used to tighten the side pieces of the frame. On this frame is laid the slats, which are held in place by a cord fastened at each end of the bedstead and passing through slots in their ends, as seen clearly in Fig. 2, which is an end section of one of the slats. This arrangement of cord and slats holds the latter in place while the repeated passing of the cord through the slats permits them to be turned over in either direction for cleaning.

The post sockets may be made circular, square, or octagonal, and this method of construction permits either the employment of artistic taste or the building of the plainest styles of bedsteads. The rails and posts may be made very light, and when the posts are removed two of these bed frames with mattresses may be placed together, with mirrors or other fragile articles between, and secured at the corners, thus making the device valuable for removal in case of fire or from any other cause. It will be seen that the greater the weight placed on the bedstead the firmer all the parts are held together. No mortising, screws, or other devices for securing the parts together are required.

Patented through the Scientific American Patent Agency May 21, 1867, by Isaac Pedrick, who will sell the rights for all the States except those of New Jersey and Illinois. He may be addressed at Bridgeton, N. J.

Fig. 2.

Fig. 1.



PEDRICK'S PATENT BEDSTEAD.

The Astor Library.

A correspondent, a resident of New York, complains of the hours of keeping open the Astor Library, which are from 9 A. M. to 5 P. M. He thinks the intention of the founder of the library was to accommodate all, whether persons of leisure or those whose ordinary duties absorbed the most of the working hours of the day. "If," he says, "it is too great a demand that the librarian or his assistants should be on duty during the day and evening, it might be as much a matter of accommodation all around to open the library only from 1 to 9 P. M." It is certain that a very numerous class of our citizens and those likely to be most benefitted by the library besides strangers, would be better accommodated with such a change of hours, and we hope the Trustees will inaugerate some such improvement.

New Crystallized Cards.

The poisonous composition with which "mother of pearl" visiting cards are made, was made public in these columns some months since. Puscher gives a simple process whereby nearly the same, and certainly as ornamental results are obtained by a mixture of harmless ingredients. He dissolves six parts by weight of sulphate of magnesia, and six parts of dextrine, in six parts of water, adds a small quantity of glycerin, and boils the liquid for a moment. He then strains the solution, and before it becomes quite cool, spreads it with a camel's hair brush upon paper previously covered with a thin solution of glue or gelatin. Variegated crystals may be produced by coloring the solution with aniline colors, and preparing the surface of the paper with a mixture of equal parts of white of egg and water, instead of the gelatin solution. When the crystals are dried, the paper is to be run between smooth rollers, or put under a press, when the surface assumes a glazed appearance.

The process thus described, as our readers will notice, is but a slight modification of the discovery of M. Auguste Bertsch, which we described in No. 18, current volume, but the application in ornamenting paper, envelopes, visiting and playing cards, is new. The author has recommended a still more useful application in preparing bank notes. A solution prepared with one third the quantity of gum before mentioned, and with no glycerin may be applied to a lithographic stone, and a copy of the crystallization be transferred to three or four working stones, from which thousands of impressions may be obtained. A back ground for bank bills may thus be prepared, and as no two crystallizations can be exactly similar, forgery of these notes is impossible. By using yellow paper, photography cannot be employed in copying them.

THE RELATION BETWEEN THE SPECIFIC GRAVITY AND PRESSURE OF GAS.

The *Gas Light Journal* gives place in its columns to a statement taken from "Orr's Circle of the Sciences," upon the relation of the specific gravity of gas to the pressure it sustains, and to the time which is consumed in burning equal quantities with the same burner. The language in which the statement is made would lead to the inference that Dr. Fyfe, who is said to have observed these relations, had made a new discovery. The relations to which attention is called, and the table of consumption per hour, with corresponding specific gravities, are as follows:

First, The consumption of gas in a given time, is as the square root of the pressure, and consequently the time required for the consumption of equal volumes, is inversely as the square root of the pressures. Second, The specific gravity of the gas is also inversely as the square root of the pressures. So that, if we determine by experiment what time it takes for a given volume of gas, of known specific gravity, to burn from a jet of the given size, with a flame of the given hight, we are then in a condition to tell the specific gravity, or rate of consumption, of any other gas, provided it be burnt under the same circumstances, and we observe the pressure. This will be manifest from the following table:

Pressure in inches of water.	Consumption per hour.	Specific gravity.
0·6	0·67	·841
0·7	0·72	·770
0·8	0·77	·729
0·9	0·81	·687
1·0	0·86	·652
1·1	0·90	·622
1·2	0·94	·595
1·3	0·98	·572
1·4	1·02	·551
1·5	1·05	·532
1·6	1·09	·515
1·7	1·12	·500
1·8	1·15	·486
1·9	1·18	·472
2·0	1·21	·461

We do not recollect seeing these relations expressed before in tabular form, but as to the principles enunciated there is nothing that has not been long familiar to gas engineers and meter manufacturers. The specific gravity of illuminating gas, if uniformly manufactured, would be an index of its quality; but it is not, as the statement to which we refer asserts, by any means synonymous with the "goodness" of gas, under usual circumstances, or even when "carbonic acid and atmospheric air" are not mixed with it. As gas is usually made, it contains many other impurities besides carbonic acid, and the test of specific gravity, though it might determine the time a certain amount would consume in flowing through a burner of specified size, would be very far from determining the illuminating power of the same amount of other gas of the same specific gravity.

The table is constructed for a burner having an aperture one fortieth of an inch in diameter with the tap so turned as to permit the flame to burn constantly at the hight of five inches. Nothing is said of the form of the section of the aperture, or the form of the burner, and the only other condition specified is that the pressure gage should be on the jet side of the tap. The results given seem to have been based upon such imperfect experiments as to render them unreliable, and the suggestion of Dr. Fyfe, that by operating in a similar manner meters and photometers may be dispensed with, seems to us in the highest degree impracticable.

A Most Important Patent---Great Lawsuits Ahead.

One of the most important pieces of apparatus employed in the operations of the magnetic telegraph in this country, called the automatic circuit breaker, was invented by Charles G. Page, recently one of the examiners in the Patent Office, but who departed this life on the 5th May. From his official position he was not permitted to take out a patent for the invention, and it has been used by all our American telegraphers, for many years without compensation. Shortly before his death, however, Congress, by a special act, removed the disability under which he labored, and granted to him the requisite patent, which is now vested in his heirs for fourteen years to come. Henceforth, no company or individual can use the circuit breaker without paying these heirs for the privilege; and thus the reward of Prof. Page's ingenuity, denied to him in person, seems likely to be reaped by those he leaves behind him.

To the general reader, unacquainted with the practical details of telegraphy, it is impossible to fully describe the nature of the invention, which we refer to, and the extent to which it applies to the business of our telegraph companies. We can only quote the admission of the *Journal of the Telegraph*, which is the organ of the Western Union Telegraph Company, to the effect that the bill granting the patent to Prof. Page practically puts American telegraphy into the hands of his heirs. It says: "All automatic closers, repeaters, local circuits, registers, printing machines, etc., are covered by this sweeping patent. Circuit breakers in actual use, or manufactured April 15, are exempt from its operation; but no machinery after that date can be employed without the consent of the patentees." So that these patentees can dictate their own terms, and make our American telegraph companies pay them almost any price they choose to ask for permission to make use of the invention.

It is not likely that so immense a claim will be conceded without resistance. When Ross Winans undertook to enforce his sixteen-wheel car patent, all the railroad companies in the country banded together to contest it, and succeeded in showing that it was invalid for want of entire novelty. So it may yet possibly be proved that Prof. Page was not the first man to divise the automatic circuit breaker, but that the idaa was already known before it occurred to him. We may, therefore, expect some interesting litigation on the subject, and a rummaging among old telegraphic literature, which has not taken place since the suits brought by Samuel F. B. Morse, and in which he was defeated, upon his patent for the general application of wires and magnetism to telegraphic purposes.—*N. Y. Sun.*

The Induction Coil Patent of Prof. Charles G. Page.

Some excitement has been created in telegraph circles by the statement that the heirs of the late Prof. Charles Grafton Page claim that the special patent granted to him, by Act of Congress, covers all known forms of telegraphy, except the simple closing of a circuit by the key and hand, practically putting American telegraphing in the hands of his heirs.

We apprehend that there must be some misunderstanding in regard to this matter. We have carefully examined the claims on which Prof. Page's patent was granted (and which have already been published in our columns), and the only clauses on which such an assumption can possibly be founded are the fourteenth and fifteenth, and these could not, in our opinion, be sustained against any of the numerous telegraph instruments invented and in use at this time. We have not room this week to go into a discussion of this subject, and must content ourselves with a few general observations.

The object of Prof. Page in obtaining the special Act of Congress referred to, was doubtless merely to obtain honorable recognition of the fact that he was (as has been demonstrated), the original inventor of the so-called Rhumkorff coil, and a vindication of his right and title to that invention. It is not probable that the idea of gain, or of making the telegraphic interests of the country tributary to him, actuated him in seeking this recognition and vindication; it was the desire to establish his reputation as a scientific man, and expose the pretensions of Rhumkorff and others, who had acquired great and honorable reputation at his expense. And even if the patent could be construed to cover all that is understood to be claimed by the heirs of Prof. Page, we doubt whether it could be maintained in a court of law and equity. Congress has no right to legislate away the vested rights of the public or of private individuals. Such legislation is doubtless unconstitutional, and would be so declared by the Supreme Court.

Prof. Page, in his position as Examiner of Patents, has passed on and approved hundreds of patents for electrical and telegraphic improvements and inventions, which now, it is claimed, are tributary to his heirs.

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When Prof. Page's application was before Congress, it was distinctly stated that it applied to induction coil apparatus, and its passage was urged as a just recognition of the scientific attainments of a distinguished American citizen, unjustly defrauded of his rights and credit in that particular branch of electrical science. Had it been intimated that the patent applied for covered telegraph inventions in use for a score of years, and which, by expiration of the original patents, had become public property, it would not have received ten votes in either branch of Congress.

Should the design attributed to the heirs of Prof. Page be persisted in, we shall have something more to say on this subject.—*Telegrapher.*

[We coincide with the views above expressed. If the claims of the Congressional patent to Page were to be interpreted according to their broad wording, there would be good reason for the indignation and alarm that prevail in telegraphic circles. But we think the claims will be held within narrow bounds.

The grant of special monopolies to private parties, by Congress, is repugnant to the spirit of our institutions, and should never be tolerated except under extraordinary circumstances, when the welfare of the whole country clearly demands it. Monopolies are burdens upon the people, and had their origin in oppression. To call them patents, or to issue them under pretense of rewarding inventors, does not alter their real character. They are still the same old legalized forms of enriching the few at the expense of the many. The people already have burdens enough to carry without being tormented by hordes of private tax collectors, armed with the special Acts of Congress. Some of the hugest patent swindles have been passed by the present Congress, and others are in a forward state for passage. Indeed, the Capitol has become a second Patent Office, and is doing a large and flourishing business, but not creditable, or beneficial to the country.—EDS.

A New Electrical Engine.

The philosophical lecture room of the College of the City of New York, on the afternoon of Tuesday, the 19th ult., was filled by an attentive audience to witness a practical demonstration of the working and power of a new electro-magnetic motor invented by Mr. Laban C. Stuart. Previous to explaining the principle and construction of the new apparatus, Prof. Doremus gave a short lecture on magneto-electricity, introducing a number of pleasing experiments, and giving a short history of the many attempts which have been made for utilizing this agency in furnishing motive power. Stuart's machine, as exhibited by Prof. Doremus, consists essentially of a horizontal central axis about three feet in length, armed with a series of electro-magnets, and having opposed to them a set of stationary magnets. With a Bunsen's battery of forty cells, the axis revolves 500 times per minute. When connection was made with a pump, a simple calculation showed the working power of the apparatus to be $\frac{1}{10}$ of a horse-power.

According to the report of the sub-director of the *écoles imperiales d'arts et metiers*, the most efficient electrical engine in France, where great attention has been bestowed upon the perfecting of these motors, is the apparatus of M. Dubos, which, with a battery of seventy cups, gives a working power of two kilogrammeters, or $\frac{1}{3\frac{1}{8}}$ of a horse-power. The same authority pronounces the next best engine to be that of Loiseau. This machine, with twelve Bunsen's cells, gives only the $\frac{1}{17\frac{1}{2}}$ of one horse-power. An electrical motor exhibited by an Englishman attracted considerable attention at the Paris Exposition. It was worked by a battery of fifty cells, and was warranted of one horse-power. When, however, subjected to an actual test, it was found to be but the $\frac{1}{15\frac{1}{2}}$ of one horse-power.

Mr. Stuart's engine is evidently ahead of either of these machines. The principle of its construction has been so highly commended that he is going on to construct larger ones. In its present incipient state, the apparatus may be employed to advantage in pumping, running sewing machines or turning lathes, or other light work. The inventor feels confident that larger engines can be built, with not a proportionate, but a far greater increase of power; founding his belief on a fact which Prof. Doremus demonstrated by showing that doubling the size of the battery much more than doubled its efficiency. The immunity from danger by fire or explosion is a great recommendation which this motor enjoys in common with others of its class. The claims for superiority peculiar to this machine are, the arrangement of the magnets, so that a steady and uniform electrical current is kept up, and so that they are only magnetized twice in each revolution, instead of many times, as in most other motors, obtaining greater power than is possible with any electrical engine hitherto invented.

As we shall soon present to our readers an engraving and description of this machine, we reserve further description till then.

Improvement in the Manufacture of Zinc

Patented by A. G. Hunter, of Flint, Wales. The zinc ores, after having been subjected to the usual preliminary treatment, are intimately mixed with the usual quantity of carbonaceous matter, and placed on the hearth of a reverberatory furnace, in which the mixture is acted on directly by the heat and flame from the fire. In order to effect the reduction of the zinc from its ore, care must be taken to prevent the presence of any free oxygen in the flame, or heated gases passing over the zinc ore mixture. This may be accomplished either by keeping a thick mass of burning fuel in the fireplace, or by introducing carbonic oxide, carburets of hydrogen, or hydrogen gas, or other deoxidizing agent, at the fire bridge, so as to be mixed with the flame from the fire before it reaches the zinc-ore mixture, care being taken to prevent the admission of air at any other part of the furnace except through the grate bars of the fireplace, which must be well filled with fuel while the zinc-ore mixture is under treatment. By the reducing action of the heated gases and flame, and of the carbonaceous matter mixed with the ore, the zinc the ore contains is liberated in a metallic state, and distills off as a vapor, mixed with the heated gases and flame from the fire. The zinc vapor is condensed to metal by causing the heated gases, flame, and zinc vapor, previous to their reaching the chimney, to pass through a pipe or condenser surrounded with water, which cools the gases sufficiently to allow the zinc to deposit. In this pipe or condenser, suitable recesses or cesspools are provided to receive the melted zinc as deposited, from which it may be run off into molds; also suitable openings, through which the pipe may be cleaned out. Either a stationary or a revolving reverberatory furnace may be used to heat the zinc ores in, and the condenser may be either vertical or horizontal, or both alternately, and the sizes of the furnace and condenser may be varied, to suit the amount of work required to be done. The inventor has found a furnace hearth eight feet square, and a condenser twenty inches diameter and sixty feet long, a convenient size; but these proportions may be varied.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

The manufacture of wall paper has not as yet been entirely superseded by the wood veneer hangings, although the latter, we are informed, are making steady progress in the public estimation. There is a factory in this city where 1,700 tuns of paper were last year converted into finished paper hangings. The facilities are such that blank paper, as it comes from the mill, can be converted in halt an hour into printed wall paper, reeled and ready for market. Cylinder machines are so arranged that a dozen colors are printed at one operation. The finer grades ot hanging are printed by hand

A good move has lately been inaugurated by the New Jersey railroad company, which we hope soon to see adopted by roads generally throughout the country. Passengers for Philadelphia, on purchasing tickets at the office, are at the same time furnished with coupons specifying the number of the car, and the seat they are to occupy, and depot ushers are in attendance to show them to their places. This system of securing seats is eminently just, guarantees a seat to all passengers, and, at the same time prevents those of an avaricious turn from appropriating to their own use more than by right they are entitled to.

It is rather a humiliating fact, that all the mechanical power exerted by a man during his lifetime is more than equaled by the power stored up in one cart load of coal. The annual coal produce ot Great Britain is equal to the power exerted by 530,000,000 horses, working eight hours per day, for one year. Taking this as a standard, the world's supply of this fuel equals the work of 924,000,000 horses, working as before.

Our mining intelligence from the tin discoveries of Missouri has not been very startling; certainly the deposits have not as yet proved themselves sources of fabulous wealth. The most favorable indication regarding their professed richness that has come under our notice, is the fact that one of the largest and best known metal firms in this city have just purchased an extensive tract of land in Madison county, which is reputed to contain one of the richest tin lodes in the State. A railroad will soon be in working order to within a few miles of the region. The local papers enthusiastically announce that recent discoveries reveal the fact that not only tin is to be obtained there, but that the mountain regions abound in iron, lead, silver, and gold, awaiting only the expenditure of capital and labor to speedily make the territory the rival of the far famed mineral territory on the Pacific coast.

The immense cost in the construction of English railroads is mainly derived from the extravagant prices which have to be paid at the outset for the land. The average of this item for all the lines has been rated at $43,000 per mile, or more than the entire average cost for each mile on our American roads. The parliamentary charges incurred in procuring a charter are also enormous, many roads having cost over $10,000 per mile. The corresponding charges in our own country are not so accurately nor so publicly estimated, as it depends entirely upon the price of each legislator.

Two public works belonging to the highest grade of modern civilization are being undertaken in Greece, the center of ancient civilization,—a telegraph line from Athens to Kephisia, and a railway to the Piræus, whence the people of the capital draw every article of consumption. The entire length of railway is but six miles, and the company can easily complete the line before the end of August, the time fixed by contract for opening the road.

A German traveler of repute, named Manch, reports to the geographical society of Gotha his discovery of two gold mines in the interior of Africa. The geological character of the section, which is located about 900 miles from Natal in a northwest direction, indicates an extraordinary amount of auriferous wealth. The existence of small pits, about three yards deep, throughout the region, would seem to indicate, as Dr. Livingstone has already said, that in former times the Kaffirs were acquainted with the art of extracting the precious metal.

Three sumptuous "drawing-room" cars have been built in Troy, N. Y., for the Hudson River railroad. Each car is sixty-four feet long, contains eight small compartments, capable of accommodating four persons each, and four other rooms suitable for an entire family. One of the large rooms is set apart for the common use of all the occupants of the car. Each compartment is fitted up with chairs, table, mirror, and other conveniences, heated from hot-air registers, well ventilated, and funished with the most elegant carpets and curtains. The cars cost $15,000 each.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

BLAST FURNACE.—Charles Mellinger, Cornwall, Pa.—This invention relates to improvements in the method of manufacturing pig iron, but having more particular reference to preparing or desulphurizing the ore before before it is introduced into the blast furnace.

MOP.—Andrew J. Davis, Hartford, Mich.—This invention relates to a new and improved method of constructing mop frames, whereby facilities are afforded for wringing the mop, and it consists in attaching the mop to a sliding frame by a holder, which is revolved by gearing and crank, for twisting or wringing the mop.

CHURN.—Geo. W. Goodwyn, Petersburg, Va.—This invention relates to an improved means for operating the churn, whereby the work of churning can be performed much more easily than by any of the old methods.

DEVICE FOR PROPELLING PLEASURE BOATS.—J. O. Belknap, Mobile. Ala.—This invention is a neat and ornamental apparatus for moving pleasure boats in a circle around a central standard, by means of horse power.

STEAM-PIPE CONNECTION FOR RAILROAD CARS.—Henry R. Robbins, Baltimore, Md.—This invention is an improved flexible and self-adjustable joint for connecting the ends of the steam pipes in a train of cars so as to admit of the heating of the ears by steam or hot air from the locomotive or from a boiler or furnace in any part of the train.

RAFTING DOG.—Charles C. Comstock, Grand Rapids, Mich.—Patented May 12, 1868.—The object of this invention is to provide a simple and cheap device for the purpose of attaching logs together to form a raft, and operating in such a manner that with it the logs can be more expeditiously as will as securely fastened together than by the means now commonly employed.

PRESS FOR CONCRETE BLOCKS.—L. S. Warner, Chicago, Ill.—Patented May 12, 1868. This invention relates to the pressing of concrete blocks, so called, which are used for building purposes, and which are lower than common brick, differing, also, therefrom in character; and it consists of molds or boxes which are filled with the concrete material, together with compound toggle or knee-joint levers for actuating the follow bottoms of the molds upward to press the concrete material into a dense building block.

SPINNING FRAME.—Frederick Haythorn, Philadelpnia, Pa.—This invention relates to an improvement in spinning frames, and it consists in providing a series of guards between the spindles, to prevent the yarn of each bobbin or cop from coming into contact with that of the adjacent bobbins or cops, on either side, during the act of being spun.

CRIBBING PREVENTER.—Michael H. Sullivan, Providence, R. I.—This invention consists of a curved plate provided with a buckle to attach it to a horse's head near the throat, and provided with a pricking point which is actuated by the flexing of the animal's head to present the point and thus deter him from the act of cribbing.

SUPPLY GAGE FOR BOILERS.—H. P. Stafford and J. A. La Farge, Decatur, Ill.—This invention relates to an improvement for regulating the supply of water in steam boilers, and which acts automatically in maintaining the proper water lever within the same, and regulates the supply of water.

HORSE HAY FORK.—John Milholland, New Concord, Ohio.—This invention relates to an improved horse hay fork, and consists of an adjustment of the trip cord by means of a trigger and of the handle, whereby the handle is protected by the side ot the eye when the fork is loaded, and the point kept straight when the fork is to be returned.

LINIMENT.—A. J. Creel, Hopkinton, Iowa.—The object of this invention is to provide a liniment for healing wounds on man and beast, and for curing inflammatory diseases and for various other aches and ails to which mankind as well as the brute creation are subject.

MODE OF TREATING MINERAL PHOSPHATES IN THE MANUFACTURE OF FERTILIZERS.—John Commins, Charleston, S. C.—This invention relates to a new and improved method of treating phosphatic minerals and earths after such miherals or earths have been treated with a solution of chloride of sodium

RAILROAD SWITCH PLATE.—Adolph Philippi, Elizabethport, N. J.—This invention relates to a new switch plate, which is so made that the rails have an elastic bearing, and that they can be removed and replaced at will, without removing the switch plate.

WATER CONDUCTOR FASTENING.—G. A. Hein, Waterford, Pa.—The object of this invention is to provide a fastening for the water conductors of buildings, which, while it presents a neat and workmanlike appearance and is durable and not likely to get out of order, shall allow the conductor to be attached to or removed from the same without removing the fastening.

FABRIC.—R. D. Hine, Mattewan, N. Y.—This invention relates to a new manner of preparing fur hat bodies, and other fabrics having a fur surface, and consists in the application of a layer of wool, the surface of which is covered with fur, and is felted together with the same, so as to form a solid fabric. The fur here referred to is that kind which is mostly used in hat bodies, and from which the skin has been removed.

SAFE-DOOR LOCK.—John G. Kriechbaum, Youngstown, Ohio.—This invention relates to a new safe lock, which is so arranged that it cannot be opened even with the correct key, unless the required movements are well known. The bolts are arranged in pairs, moving in opposite directions, one bolt moving out while the other is thrown in by the key, so that there will always be one bolt out, which locks the door, unless one bolt is, at the proper time and by the proper motion, thrown out of gear. In the door no hole for the insertion of the key is to be seen when the door is locked, and the key bole cannot be opened unless a certain plate is moved on the under side of the safe.

TAG FOR STRAPS.—Edward Wadhams, Yorkville, N. Y.—This invention relates to a metallic tag or tip for straps, such. for instance, as skate straps, harness straps, and the like, which are frequently buckled and unbuckled, and are very liable to have their ends turned or coiled up and frayed out, so as to render it difficult to insert them through the loops of the straps. It consists in encasing the end ot the strap within a thin strip of sheet metal, whereby the end of the strap is preserved and rendered capable of always being readily passed through the loop and retained in proper shape.

WASHING MACHINE.—John C. Crawford, St. Charles, Ill.—This invention relates to an improvement in the construction of a washing machine and clothes presser, and consists in forming a long box, or trough, with a corrugated bottom, and provided with two large heavy rollers, connected with a lever, by which the rollers are moved over the corrugated bottom of the box to wash the clothes by rubbing with their combined and reciprocating motion.

HARNESS.—S. L. Gray, Chilicothe, Ohio.—This invention relates to a new and improved harness for controlling vicious horses, the parts being constructed arranged and applied to the horse in such a manner that the latter will be entirely within the power of the driver or rider.

EVENER.—Freeman N. Corbin, Champlain, N. Y.—This invention relates to a new and improved application of a double tree to the draft pole of a wheel vehicle, whereby the clevises to which the whiffletrees are attached will be shifted laterally, one being brought nearer the draft pole as the other is moved outward from it, so that the most ambitious or the strongest pulling horse, whenever he exerts himself more than the other, will have his average power on the double tree decreased, while at the same time the average power of the other horse will be proportionably increased. By this arrangement a team will soon be made to pull evenly, without any special care or attention on the part of the driver.

WOOD POLISHING MACHINE.—H. O. Hooper, Diamond Springs, Cal.—This invention relates to a new and improved machine for polishing and smoothing doors, and other articles constructed of wood and having plane surfaces It consists of one or more pieces of rotary polishing plates, operating in vertical planes, in combination with one or more pairs of reciprocating polish-plates, and a feed mechanism.

CORN PLANTER.—J. M. Allison, Cranberry, Pa.—This invention has for its object to furnish a simple, convenient, and effective machine, by means of which corn may be dropped accurately and rapidly by hand power.

TRACE HOLDER FOR HARNESSES.—Stephen Stout, Tremont, Ill.—This invention has for its object to furnish a neat, simple, and convenient device for attachment to the harness, upon which the traces may be hooked when detached from the whiffletree, so as to hold them securely and prevent their dropping down and being stepped upon by the horses, or being injured by tying them.

CARRIAGE WHEEL.—Anselmo B. Smith, Plattsmouth, Nebraska.—This invention consists in a novel and improved manner of securing the spokes of wheels in a metallic hub, and in a peculiar construction of the hub, whereby a very strong and durable wheel is obtained, and one which may have its spokes adjusted to compensate for any shrinking thereof, so as to avoid the lowering of the tire and the necessary shrinking of the same, which is now required in wheels as ordinarily constructed.

HORSE COLLAR AND HAMES.—Alexander Dunbar, New York city.—This invention relates to a new horse collar, of that class which is known as the folding collar, that can be opened on top, so as to put around the horse's neck without having to be slipped over the head of the same. It consists in the use of a metal lock, which serves to fasten the upper ends of the hames together, and which is adjustable in notches cut into the hames, so as to adapt the device to various sized horses.

POCKET FAN.—H. B. Smith, Essex Conn.—This invention relates to a new lady's fan, which is so arranged that the handle can be folded out of the way when the fan is folded together, whereby the handle will be protected, and will not be liable to break off.

ORNAMENTING FABRICS.—Wm. Swan, New York city.—This invention relates to a new process of ornamenting fabrics of all descriptions, such as gauze, silk, and others, and consists in securing a series of small beads or drops, made of gum arabic, to the fabric; said beads being translucent, so

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that they appear to be drops of water, or like pieces of crystal or glass on the fabric, and serve in a large degree to increase the beauty and appearance of said fabric.

VEGETABLE MASHER.—E. Brown, Burlington, Vt.—This invention relates to a device for mashing boiled potatoes, or other vegetables, and consists in the arrangement of a perforated inclined frame, and of a smooth presser sliding and swinging thereon, all being so arranged; that the mashed body or pulp of the potato or other article will be forced through the meshes or perforations of the frame, while the peels will not pass through the same, but will fall into a dish or pan placed for their reception.

RECTIFIER.—E. A. Müller and Theodor Stock, Chicago, Ill.—The object of this invention is to so construct a rectifier or doubler, that the process of distillation may be quickly carried on, that, directly from the mash, pure spirits may be produced, and that the different grades of liquor may be well separated from each other.

BIT STOCK.—Isaac C. Tate, New London, Conn.—This invention relates to a new manner of arranging a bit stock, which will not only be adapted to hold any sized shank, but which is also adapted to grope both the square shank and the round body of a bit, whatever their relative thicknesses may be.

ARTIFICIAL LIMBS.—B, Briorday, Detroit, Mich.—The nature of this invention relates to improvements in artificial legs and feet, to be used in substitution of the human leg below the knee joint. It consists principally in the construction of the ankle and toe joints.

MOLE TRAP.—Clark Polley, Sinking Spring, Ohio.—This invention consists of a trap for the destruction of moles. It consists of a mechanism for acting a fork or spear into the ground, the said mechanism being attached to two pointed stakes, so that the trap may be set over a mole path. The trap is sprung by the action of the mole in returning through his path, and in so doing it presses against a trigger board resting across the path, and thus liberates the spear, which transfixes the animal.

PENCIL HOLDER.—Edwin J. Toof, Fort Madison, Iowa.—The object of this invention is to provide a pencil holder which bears an erasing pad suitably located in the exterior case of the holder, near the point of the pencil, whereby in the operation of marking or writing the erasive pad will be presented in a convenient manner for expunging marks made by the pencil.

DEVICE FOR PULLING HOP POLES.—Isaac W. Legg, Long Eddy, N. Y.—This invention relates to a new and useful device for pulling hop poles, and it consists of two hand levers connected by a pin and arranged similarly to a tongs, and provided with a fulcrum block, all being constructed and arranged in such a manner that the device may be adjusted in a proper relative position with a hop pole, and the latter pulled up out of the ground with the greatest facility.

BEEHIVE.—Peter Compton, Sullivansville, N. Y.—The nature of this invention relates to improvements in beehives, having for their object a ready means of protecting the bees from the attacks of insects or other colonies of bees; also a means of transferring them from one hive to another, more perfect ventilation, an arrangement of boxes whereby the box honey may be readily taken out in cakes as required for use, and a means of shutting off the communication between the main hive and the upper portion where the glass boxes are placed.

GAGE FRAME FOR SLITTING RAW HIDES.—James Hoffman, Belvidere, N. J.—This invention has for its object to furnish an improved machine by the use of which raw hides may be slit or halved much more conveniently and accurately, and with much more rapidity than is possible when the work is done in the ordinary manner.

WATER CLOSET.—William Sprague, Lynn, Mass.—This invention relates to a new and improved method of constructing water closets, whereby they are more simple in construction and the escape of offensive gases into the room is prevented.

BOBBIN FOR SEWING MACHINE SHUTTLES.—D. M. Church, Birmingham, Conn.—The object of this invention is to obviate the necessity of the operator winding the thread on the bobbins, and have that work performed by the thread manufacturers, who do it by machinery and in a perfect manner.

LANTERN.—P. J. Clark, West Meriden, Conn.—This invention relates to a new and improved application of guards to a lantern, whereby several advantages are obtained over ordinary lanterns.

MACHINE FOR WASHING BRISTLES, HAIR, ETC.—Louis F. Lannay, Indianapolis, Ind.—This invention has for its object to furnish a simple, convenient, and effective machine for washing and grinding bristles, hair, and other similar substances.

MODE OF SETTING CORNICES.—C. C. Hare, Louisville, Ky.—The present invention consists in using a cast-iron inside bracket or look out, whereby the cornice is rendered fire-proof, the cornice being secured to the said bracket or lookout with screws passing through lugs at suitable points of the same, with the screw heads countersunk so as to be embedded in the sheet metal, leaving a smooth outside surface with no wood near it.

PIPE WRENCH AND CUTTER.—James L. Brierly, Auburn, Mass.—This invention relates to a new device for clamping and cutting pipe, and consists in the arrangement and combination with each other of a screw rod, nut, head cutter and clamp. The rod is screwed into the nut, to which the head is pivoted, the head being bent like a hook. To the end of the screw rod, which is between the nut and the hook, can be fastened either the clamp or the cutter.

DRAFT ATTACHMENT OR EVENER.—W. P. Brooks, Bloomington, Ill.—This invention relates to a new and improved draft attachment or evener for vehicles and implements which are drawn by horses, and it consists in a peculiar construction of the device, whereby the draft may be equally divided between the two or three horses which may be applied to it, or an advantage (ease of draft), allowed either horse if necessary to do so.

PRODUCING IODINE FROM MUSSELS.—Jules Fougeret, New York city.—This invention relates to a new manner of extracting iodine from mussels or their shells.

HORSE HAY RAKE.—Watson A. Heath, Apalachin, N. Y.—This invention has for its object to improve the construction of revolving hay rakes so as to make them more convenient and effective in operation.

HELIOMETER.—Conrad Friedrich L. Risch, Huntingburgh, Ind.—This invention relates to a new apparatus which is a perfect sun dial for all latitudes, and by which the time of the day can be ascertained with exactness by minutes and seconds, also the degree of latitude above which the sun stands perpendicular during any one day. Also the date and length of day, as well as the time of sunrise and sunset. By its use the reason for the variation in the length of days is made perfectly clear. The difference in the time of day between any two places on the globe can also be accurately ascertained, as well as the position of the earth's axis in relation to the surface of the water and the size of the angle formed by the axis on the water line; also the angle formed by the rays of the sun at noon of each day upon the water line or level.

EXTENSION NOTICES.

Joshua Gibbs, of Canton, Ohio, having petitioned for the extension of a patent granted to him the 15th day of August, 1854, for an improvement in plows, for seven years from the expiration of said patent, which takes place on the 15th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of July next.

Wm. D. Andrews, of New York city, having petitioned for the extension of a patent granted to him the 22d day of August, 1854, for an improvement in centrifugal pumps, for seven years from the expiration of said patent, which takes place on the 22d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 27th day of July next.

Horatio N. Gambrell, of Baltimore, Md., and Thomas D. Bond, of Washington, D. C., administrators of the estate of Singleton F. Burgee, deceased, having petitioned for the extension of a patent granted to the said Singleton F. Burgee the 27th day of February, 1855, antedated the 22d day of August, 1854, and reissued the 17th day of November, 1857, for an improvement in carding machines, for seven years from the expiration of said patent, which takes place on the 22d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday the 3d day of August next.

Solomon S. Gray, of Boston, Mass., having petitioned for the extension of a patent granted to him the 22d day of August, 1854, for an improvement in machines for planing lumber "out of wind," for seven years from the expiration of said patent, which takes place on the 22d day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday the 3d day of August next.

Joseph H. Tuck, of Brooklyn, N. Y., having petitioned for the extension of a patent granted to him the 26th day of June, 1855, and also granted in England the 25th day of August, 1854, for an improvement in packing for stuffing boxes, etc., for seven years from the expiration of said patent, which takes place on the 25th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of August next.

Sarah W. Flanders, of Newburyport, Mass, administratrix of the estate of Joseph F. Flanders, deceased, and Jeremiah A. Marden, of Boston, Mass., having petitioned for the extension of a patent granted to the said Joseph F. Flanders and Jeremiah A. Marden the 29th day of August 1854, for an improvement in leather-splitting machines, for seven years from the expiration of said patent, which takes place on the 29th day of August, 1868, it is ordered that the said petition be heard at the Patent Office on Monday, the 10th day of August next.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

P. B., of Kansas.—Smiths frequently restore burnt steel by heating it to a low red, and plunging it in water at the ordinary temperature. Experiments made in Berlin, Prussia, seem to prove that boiling water is preferable.

J. J. N., of Pa.—"Which of two spiral springs, one of quarter inch round steel and the other of quarter inch square steel, tempered alike, would be the most powerful?" Reason would seem to indicate the one of square steel, as its cross section contains within its square the cross section of the round steel, and is therefore the heavier.

J. G. S., of Pa., will find the important points of his article on steam boiler ruptures on pp. 325 and 326 current volume.

C. A. A., of Mass.—The tinning on the inside of old copper vessels may be removed by immersing the vessels in a solution of blue vitriol; the tin is dissolved and the copper left bright. Old copper is more valuable and brings a higher price when deprived of its tin.

G. W. A., of Ga.—The submarine torpedoes used in the late war were, in all essential respects, similar to those invented and used by Robert Fulton. His description is "a copper case two feet long, twelve inches in diameter, containing one hundred pounds of powder, having a lock similar to a gun lock to contain a musket charge of powder; the box, with the lock cocked and barrel charged screwed to the copper case. The lever at top has a communication to the lock inside the box, and holds the lock cocked and ready to fire, a weight holding the torpedo down to any given depth under water, and a small anchor preventing the tide from moving it from position." Of course, the movement of a ship, should she strike the lever, would make the explosion certain and instantaneous. By these means Fulton in 1805 blew up a brig of 200 tuns in Walmer Roads, and in 1807 he blew up another in the harbor of New York under the direction of our Government.

W. W. B.—The sale of your American patent does not prevent you from obtaining patents elsewhere.

M. J. P., of N. Y.—Musk is an animal secretion, procured from the musk deer, and sent from China—Tonquin—Siberia, and Thibet. It is too scarce and costly to be expected here in a pure state. Other animals secrete a substance similar to the true musk, as the muskrat known well as an inhabitant of our northern streams and ponds, but we believe no successful effort has been made to procure a commercial article from this source.

D. J., of Mass—Prussian blue is simply a preparation of an oxide of iron. It is wholly a mineral, although blood, hair, horn, etc., are used in its manufacture.

S. J. K., of Fla.—Elliptical gears are not at all uncommon. They are used extensively in slotting and shaping machines where the stroke one way should be slow and the other rapid. Even square gears, or those with the four sides slightly concave, are in use.

D. F. J., of Ill.—Musket and rifle barrels are made either of steel or iron. If of the former they are usually made from a solid bar and drilled, the barrel being placed vertically and revolving, while the drill is stationary. Steel barrels are, however, sometimes rolled, as iron barrels generally are. In this case the barrels are hollow. They are formed from "skelps," which resemble in form roofing shingles, although somewhat smaller. These skelps are placed in a furnace, heated to a nearly white heat, and passed between rollers which bring the two longitudinal edges nearly into contact. Repeated heatings, some of them being of a welding temperature, and repeated passings through the rolls, complete the forging of the barrels. The scores in the rollers through which the barrels pass are of regularly varying diameter from the point that forms the muzzle of the barrel to that which makes the enlarged breech end. A mandrel is passed through the tube or barrel at each successive rolling, from which the rollers draw the barrel. After straightening, the grinding the outside and drilling the caliber produces the barrel ready for rifling, and polishing, fitting the breech pin, etc., prepares it for stocking.

J. D. H., of N. Y.—Inlaying of metals is, so far as we know, purely hand labor. It requires much experience and skill and not a little of true artistic taste. Much of it is done on pistols and rifles, mainly by foreign-born and foreign-educated workmen. The substance of the steel and iron is recessed according to the design, by means of chisels, the sides of the cut being beveled under. The gold or silver, in the form of wire, square or round, is then hammered in and is secured by the bevel of the channels.

T. G. B., of Pa.—Air impregnated with carbonic acid will not become purified when passing it over vegetable or animal charcoal; the best agents for this purpose are caustic potassa, soda, or quicklime.

J. S., of Ohio.—The easiest and cheapest way to make a small quantity of oxygen gas without galvanic battery is to heat a mixture of chlorate of potassa with one quarter of its weight of pounded glass, sand, or black oxide of manganese; half an ounce of the chlorate of potussa will produce a little over a gallon of gas.

W. D. M., of N. Y.—Gasolin is the first product in the distillation of petroleum; it is nothing but a very light benzine. It can also be made from this article by re-distillation, and may be obtained from almost any petroleum distiller. Paraffine oil is the last product of the same distillation; it is a mixture of oil and paraffine; they are separated by cold and pressure in the same way as lard and lard oil, or spermaceti and sperm oil. Pipe clay is not manufactured, but found in the natural state in many localities; its chemical name is silicate of alumina, and it is found to consist of about 60 parts of silica and 40 of alumina.

G. R., of N. Y.—The termination *a* has already been proposed by some chemists for all the oxides, not only of the alkaloids but of all the metals of which the termination is *um*; so they write not only alumina calcia but also cadmia, platina, etc. However, in all cases where the substances have English names, it is not probable that this innovation will soon be introduced, and we will continue writing lime for calcia, oxide of iron for ferra, oxide of gold for aura, etc.

J. L. C., of N. Y.—The value of graphite or plumbago depends entirely on the quality. It is found in the United States in different localities but in many places so impure as to be almost worthless, at least as long as the pure article can be had at the same primary cost of simple quarrying. The only way to find out the practical value of a graphite mine is to bring a quantity of it to a manufacturer of lead pencils, stove black, crucibles, etc., who then soon can decide if it is worth the quarrying. We have lately seen some fine specimens of graphite from this State and from Canada; if these were not picked out specimens, but average samples of large deposits, the mines are doubtless valuable.

A. R, W., of Mass.—When india-rubber remains sticky after working it, it is a proof that the temperature was too high, or that too much turpentine was used in the solutions or varnishes; the turpentine rubber varnish has naturally a tendency never to dry; benzole is better. Vulcanizing with sulphur is the usual remedy against the stickiness of the pure rubber. We refer back to former correspondence on this subject found on page 327.

A. C. C., of Montana Ter., complains that his city is so infested with "chintz" or "bed bugs," and that every crack of the houses is filled with them, that coal oil and turpentine is too dear out there, and he proposes to smother them with carbonic acid gas. This would be of little benefit; perhaps the cheapest remedy is bichloride of mercury, usually called corrosive sublimate, dissolved in water and applied to the cracks; its destructive operation to this vermin is permanent and not momentary like turpentine, of which the effect ceases as soon as it is evaporated. It is used here in most public institutions for exterminating this verm in when rooms, cabins, or bedsteads are contaminated with it.

W. W. G., of Colorado Ter.—Alum is one of the best remedies to make whitewash of lime which will not rub off. When powdered chalk is used glue water is also good, but would not do for outside work exposed to much rain. Nothing is easier than to give it any desired color by small quantities of lampblack, brown sienna, ocher, or other coloring material.

J. B. T., of Mass.—Mica is a transparent mineral found distributed as small scales in granite. Occasionally it occurs in larger pieces. It is exceedingly laminated and therefore easily split up in very thin plates, its principal constituents being silica and alumina and therefore being incombustible is used in doors of stoves, and not being fragile is also used in lanterns, and even lamp chimneys have been made of it. It is a comparatively cheap article, and may be obtained from several stove manufactories in New York. It is not adapted for spectacle glasses, except for the simple protection of the eyes, as it cannot possibly be ground to lenses like glass.

C. H. R., of Mass.—"What kind of plunger is the best for pumping hot and cold water to supply a high pressure steam boiler?" The ordinary solid plunger is the best known for either hot or cold water. There is always difficulty in pumping hot water from the fact that steam or vapor will accumulate in the barrel of the pump, and being elastic it prevents the water from entering. To remedy this the supply should be kept sufficiently above the pump to lift the valves by the force of gravity. A cold water pipe may be introduced to the barrel of the pump to cool it and condense the steam when the pump refuses to work.

E. F. S., of Pa.—"Has a steam engine of ten inches bore of cylinder and thirty inches stroke more or less power than one of the same bore but with only fifteen inches stroke, if the pistons be run at the same rate?" Very likely our correspondent means by "same rate" the same number of strokes. If so, the longer stroke engine would be the most powerful. But if the pistons of the two engines travel the same number of feet per minute, other things being equal, the power will be practically the same.

Business and Personal.

The charge for insertion under this head is one dollar a line.

See Wheeler & Wilson's buttonhole attachment, making one hundred buttonholes an hour. The desideratum for families, dressmakers, and manufacturers. No. 625 Broadway, New York.

For sale—Road or State rights to make and use Blythe & Hayes' patent machine for turning off locomotive crank pins in the wheel. Address W. Blythe and N. Hayes, Alexandria, Va.

The surest detective of low and high water, and high steam in boilers yet invented. Springer, Hess & Co., Philadelphia, Pa.

Mill-stone dressing diamond machine, simple, effective, and durable. Also, Glaziers' diamonds, and for all mechanical purposes. Send stamp for circular. John Dickinson, 64 Nassau st., New York.

Funston's electric toy.—See advertisement.

For Sale—Eight new portable steam engines, thirty horse-power each, of superior construction. Address Poole & Hunt, Baltimore.

Wanted—the address of plow makers everywhere. Address J. E. Jinkins, Milton, Fla.

Broughton's patent standard oilers are undoubtedly the best, and are the cheapest in the long run.

Responsible or influential parties where new jails or prisons are being built or proposed, or where they are insecure, may address, to their advantage, Walter Wells, actuary Hill's Air Alarm Co., Portland, Me.

Wanted—the address of the manufacturers of the most approved cooperage machinery. Address A. B. Seger, New Orleans.

A second-hand, good turbine water wheel that will give ten or twelve-horse power, with twenty feet head, is wanted by W. R. Norris, Fort Ann, N. Y.

Steam gages, whistles, and valves—for a good article address Bailey, Farrell & Co., Pittsburgh, Pa.

Broughton's graduating lubricators for valves and cylinders are the best. Address your orders to Broughton & Moore, New York.

Part interest, or whole of a patent for a valuable advertising medium for sale. Address H. Pearson, Washington, D. C.

Read Howard & Co.'s advertisement of Waltham watches on last page and note the low prices.

Winans' Boiler Powder (11 Wall st., N. Y.) A positively uninjurious remedy for incrustations, 12 years' references. Beware of frauds

For the greatest improvements in harvesters, address F. C. & W. Cappage, Terre Haute, Ind., inclosing stamp.

Gage cocks—the only really first-class are Broughton's. Address 41 Center st.

Linton's patent carriage-seat riser—descriptive circulars free. J. R. & O. E. Linton, New Bedford, Mass.

Two sets superior iron-frame cards, 48-in. breakers, 40-in. finishers, one 30-in. double-cylinder roll card, one 24-in. do., one 200-spindle jack. For sale cheap. Apply at Union Iron Works, Rhinebeck, N. Y.

Wanted—the address of every canvasser in the United States. Send two stamps to P. & K., Box 2359, Cincinnati, Ohio.

I desire to buy a popular patent for the State of New York. Address A. Roberts, Box 2931, Buffalo, N. Y.

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Improvement in Machines for Punching Sheet Metals.

The machine seen in the engravings accompanying this article appears to be in several respects a valuable improvement on those in general use. With it no measurements or markings are required, and there is no sticking of the sheet to the punch. The die is reciprocating, while the punch itself is stationary but adjustable. It is perfectly simple in construction, not, in this respect, differing materially from others, and is easy and handy in operation. In form, size, and gearing, it may be adapted to the work to be done. The machine shown in Fig. 1 is one without gearing. The die, A, is actuated by means of an eccentric, B, through the medium of a pitman, C, and slide. The block, D, in which the die, A, is secured, has a passage, E, through which the punchings of the metal are discharged. The cam, F, actuates a forked lifter, G, having a convex upper surface, by means of the bar, H. The forks of this lifter stand one on each side the punch holder, I. The lifter is raised as soon as the hole is punched, and falls back instantly, giving ample time for the workman to adjust the sheet before the die returns to the punch. The punch is adjusted to hight by means of a screw, J, seated in the bottom of the punch holder. Gages, one seen at K, Fig. 1, and others secured by clamps, L, to the sheet, are used to guide the punch. The holes in these gages are made larger than those intended to be punched in the sheets, and the punch is made with a convex shoulder, as seen in M, Fig. 2, to readily adjust the gage and sheet. This form of punch and gage allows the punching of any shaped hole desired without special gages. Fig. 2 shows how easily raised impressions may be formed to any required hight by the adjustment of the punch.

By means of a set of gages all descriptions of work may be performed without the necessity of laying out and marking for the holes. The adjustment of the punch is an excellent feature, which will commend the press to mechanics. It appears to be a very simple, effective, and practical machine. This improvement was patented through the Scientific American Patent Agency, Nov. 12, 1867, by Morris Seiferth, who may be addressed at Morristown, N. J.

Fig. 1

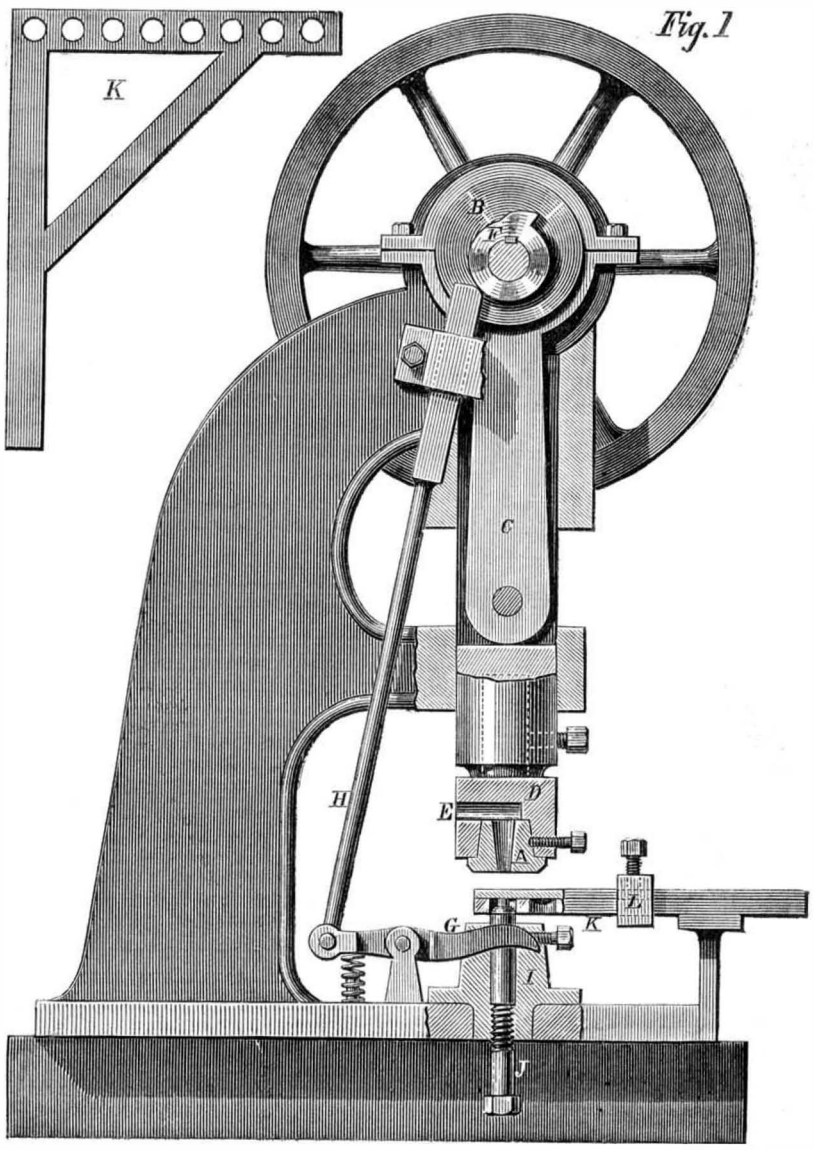
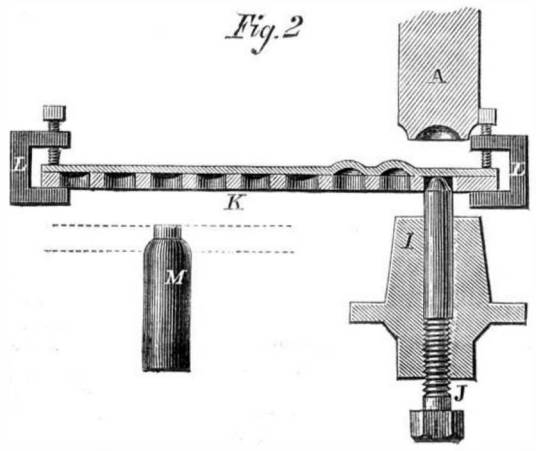


Fig. 2



SEIFERTH'S GAGE PUNCHING MACHINE.

PLIABLE GLASS.

About three months ago we called attention to a new material, which had been introduced in Paris by M. A. Marion under the above name, possessing valuable qualities for many photographic purposes. We have just received from Messrs. Marion & Co., of Soho Square, some sheets of the new material for experiment, and a brief description will doubtless interest our readers.

The "caoutchouc pellicle" is in sheets the size of photographic paper, about 22 by 18 inches. It is thin, colorless, transparent, exceedingly pliant, possesses a fine surface, and is waterproof, or nearly so, not being affected by fluids until after long treatment, and then only slightly. It is exceedingly tough, bearing considerable strain without tearing, and is slightly elastic, stretching a little when pulled.

The multiplicity of purposes to which a material having most of the properties of glass without its frangibility, and which might be called flexible glass, may be applied in photography will occur to most readers.

At present we have only had opportunity for experiment in two directions with the sheets sent to us. We have employed it as a protective surface to small pictures, in a manner similar to that in which sheets of collodion and gelatin have been used, and also as a substitute for glass in taking negatives. For the first purpose its application is simple and easy. A sheet of the material, having been cut to the required size, is immersed for a few minutes in clean water, or dilute alcohol and water would be better still. The picture to be protected is then wetted, either by holding under a tap, or immersing in a dish of water. The wet, vitreous sheet is then brought into contact with the wet surface of the print, which till then is kept in a horizontal position; the two being then raised into a vertical position, and drained, the surfaces come into close contact, the water running out from between them driving away all air bubbles. A sheet of paper is placed over the surface, and the whole rubbed well down to secure firm contact. The protected print is then dried under pressure. The appearance of the finished print is very similar to that of a print "enamelled" with gelatin and colodion.

In our attempts to use the vitrified sheet as a support in producing negatives, we proceeded as follows:—A piece of the sheet is cut about a quarter of an inch less than a plate of glass of any suitable size. The vitrified sheet is moistened at the back, and placed on the plate of glass, to which the moisture causes it readily to adhere. It is then coated with collodion, which, flowing over the edge of the sheet and up to the edge of the glass, protects it from displacement in the nitrate bath. This done, the manipulations are conducted in the usual way until the negative is finished, when it is easily removed from the glass by running a penknife round the edge and lifting away the negative on its limp transparent support. There are certain precautions necessary in these manipulations. It is important to see that the pellicle is quite flat on the glass without wrinkles, and that the edges do not curl up so as to permit the collodion to flow under between the vitrified sheet and the glass. The inconvenience and imperfection which would arise if care were not taken in this respect will be readily understood.

The most curious difficulty we met in using the new material as a substitute for glass in taking negatives is one which we hope is exceptional, or in any case we are disposed to believe it is avoidable. It is this,—the exposure required is much longer.

We may here mention an ingenious application which Mr. Woodbury has for some time contemplated making of such a material as this. He proposes to sensitize a long strip of it by some trustworthy dry process; and, providing a camera with a couple of rollers, wind off from the supply roller sufficient for a negative. After exposure this would be wound on to the other roller, and a fresh supply at the same moment brought opposite the lens for further use. The compactness and convenience of such an arrangement will be readily understood. The working out of such an arrangement is a matter of detail which we need not discuss here.

The exact nature of the material and its mode of preparation are, of course, M. Marion's secret; but as photographers rarely like to work with materials of the constitution of which they know nothing, we may state at once that there is very little doubt that the basis of this fabric is collodion; and although it is named vitrified india rubber, it is very doubtful whether india rubber enters at all into its composition. The strong and peculiarly characteristic smell of castor oil is one of the first characteristics which came under our attention in examining the pellicle. On treating it with benzoline it remains unaltered. It is at once penetrated by ether, and softened, but, like collodion films under such circumstances, not readily dissolved. It burns in the rapid explosive manner of pyroxyline, leaving a little sticky residue like burnt oil. Dr. Vogel described in our pages about a year and a half ago the "leather collodion" of Herr Grune, made from plain collodion containing four per cent of soluble cotton and three per cent of castor oil, and this appears to be a substance of a similar constitution. Dr. Vogel proposed to supplement a film of the leather collodion with a layer of india rubber in certain cases, and he describes the films so prepared as very solid and a little elastic. The object for which the preparation was then proposed was the transfer of negatives. It appears probable that to M. Marion has occurred the happy thought of expanding this idea, and forming a transparent fabric in sheets ready for use, which will have a variety of applications. Whatever the precise nature of material employed, the skill with which it is prepared, and the beautiful transparent, tough, and flexible pellicile produced, confer a boon on photographers generally.—*Photographic News.*

LECTURES ON THE ANIMAL KINGDOM.

On Monday evening, May 18th, Mr. Hawkins delivered the fifth and concluding lecture of his course, in Plymouth Church, Brooklyn. It would be impossible to convey to those of our readers who have not heard this gentleman any adequate idea of the value of his lectures, or of the peculiarities of his style of delivery, on the latter of which much of the former depends. His perfect mastery of the subject is shown in every illustration he makes and every word he utters. Appealing to two senses at once, those of seeing and hearing, he does not confuse, but the appeal to one sense serves to illustrate and intensify the appeal to the other.

Mr. Hawkins converses with his audience rather than lectures to them. Although the conversation is audibly carried on only by him, yet he so readily anticipates questions and objections that the illusion is complete. And while thus talking in a rapid, familiar, terse, and amusing style, he is as rapidly eliminating and illustrating on the blackboard the theses and propositions of his subject, by a series of the most masterly drawings; not mere crude outlines, but finished and perfectly artistic representations. It is doubtful if he has an equal in his specialty. We were glad to be informed by him that it is probable he will be enabled to repeat his lectures, as he is to remain here for some time, having been engaged by the Park Commissioners to arrange a zoological garden at Central Park.

Mr. Hawkins must be heard to be appreciated, as his lectures, when written, are shorn of the peculiar charm and interest imparted to them by his inimitable manner. We present below a crude outline of the three last lectures of the course, being the continuation of the report begun on page 329, this volume.

The "Age of Dragons" was the very attractive title of the third lecture. The text, as it were, for the evening's entertainment, was a quotation from a British author, who some thirty years ago affirmed that, "Of Fancy's Monsters, the winged, fiery, scaly Dragon has been the most accepted fable in existence, and is found everywhere except in Nature."

Mr. Hawkins professed his readiness to show that the Dragon was not a myth, nor a creation of man's imagination, but that its representative could actually be found in nature.

That the traditions of the oldest nations all recognized the existence of these creatures, and represented the form with a great degree of similarity, is evidence in itself that the dragon once lived. These various forms all indicated a reptile, or cold-blooded animal having a reptilian nature. After delineating on the blackboard the various groups of this family, showing how the characteristics of each found a counterpart in the ideal representation, he described the fossil flying saurian or pterodactyl which he pronounced to be the original dragon. In this animal, by the excessive elongation of the little finger of the fore feet, support was afforded to a membrane which extended to the tail and made a wing for flying. The remaining fingers were short and furnished with claws. They had the wings and habits of bats, but may be considered as adaptations of the reptilian type to the air. The fiery qualifications attributed to the ancient dragons may be explained by the fact that, feeding on fish, the decomposed particles remained in the teeth of the creature, and being highly phosphorescent may have given enough light to have originated the notion of breathing forth fire and flame.

The fourth lecture of the course was on "Ancient and Recent Birds." The process and various stages of development, from the embryo in the egg, to the full-grown bird were beautifully illustrated. Several species of the feathered tribes belonging to past geological epochs, and others of more modern but no extinct races, were also pictured and described.

The concluding lecture was devoted mainly to a comparison or contrast between man and the higher orders of quadrumana, as the gorilla, chimpanzee, etc. He insisted that these animals cannot be classed with men, as it was impossible for them to use one pair of their hands for locomotion while employing the other pair for other purposes, and the general structure of the skull and the upper limbs was such as to make a marked distinction between these animals and man.

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Scientific American.

MUNN & COMPANY, Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW (PARK BUILDING), NEW YORK.

O. D. MUNN, S. H. WALES, A. E. BEACH.

☞ "The American News Company," Agents, 121 Nassau street, New York
☞ "The New York News Company," 8 Spruce street
☞ Messrs. Sampson Low, Son & Co., Booksellers, 47 Ludgate Hill, London, England, are the Agents to receive European subscriptions or advertisements for the SCIENTIFIC AMERICAN. Orders sent to them will be promptly attended to.
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VOL. XVIII., No. 23....[NEW SERIES]..*Twenty-third Year.*

NEW YORK, SATURDAY, JUNE 6, 1868.

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IMPORTANCE OF BALANCING THE PARTS OF MACHINERY.

This heading does not refer to the proper proportions of the parts of a machine one to the other, but to the balancing of pulleys, cams, fly-wheels, etc., which receive a rotative movement, whether rapid or slow. There can be no doubt but that much power, otherwise valuable and useful, is absorbed and wasted by the unequal gyrations of the rotating parts of machinery that might be saved and utilized by some care and attention. Even a sprung or crooked shaft, although its circumference comprises its points of support, will not only rapidly wear out the journal boxes in which it runs, but also require more power to drive it than one which is perfectly true. The pulleys which it supports multiply, in a geometrical ratio, the untrueness of the shaft, and cause the belts leading to or from them to flap continually, each alternate upward and downward movement of the belt alternately releasing and engaging with the pulley face, or alternately diminishing and increasing friction; so that in effect, the belt becomes a hammer or an alternating load, now light and now heavy.

Tests have lately been made to ascertain the amount of actual loss occasioned by an improper balancing of revolving machinery, but they have not so far progressed as to enable us to give the figures; yet we are satisfied that want of attention to this matter occasions a shameful waste of power, which is, under all circumstances, valuable and generally costly. When a machinist finishes a head for a tongueing and grooving machine, he balances it after the cutters are placed; the makers of circular saws balance them; the knife cylinders of planing machines are similarly balanced. All these run at high rates of speed, and many of our mechanics seem to think that only under these circumstances is there any need of paying attention to the balancing of the rotary portions of a machine.

We think this to be a mistaken notion. Unless revolving very slowly, a pulley, gear, fly-wheel, or grindstone ought to present the same resistance to the power at one point of its revolution as at another; in other words, it should be balanced. Why the driving wheels of locomotives should receive a counterbalance to the crank pin and its dependencies, while no such device is attached to stationary or marine engines, always seemed to us singular. We account for it only that it is a *cosa de España*, or a "custom of the country," rather than that the velocity of motion alone is considered; for some stationary and marine engines approach, in the velocity of their revolution, very nearly the railroad engine.

It would be a matter of little cost and little additional labor to balance each pulley intended to run on an overhead shaft or on a machine, by testing it before it was taken from the lathe where it had been bored and turned, and insuring, by devices well known to mechanics, a perfect evenness of rotation. If this plan were followed as a general thing, the cost of useful power would be reduced and also the cost of repairs to belts, adjustment of boxes, etc.

MACHINE SHOP SURGERY.

Few, except those who have been practical machinists, or iron workers in other departments, know the risks run by those employed, or the means used by workmen to remedy the bad effects of accidents. It is not too much to say that many a "greasy mechanic" understands better what to do in case of accident than the surgeon who can boast his diploma, and has attended course after course of anatomical lectures.

Frequently a workman receives a particle of iron or steel in the eye, while turning or chipping, and the "doctor" of the shop is called upon for his services. (We never yet saw a shop that did not possess its doctor for these emergencies.) Wiping his greasy hands on his overalls, the doctor ruthlessly turns back the upper or lower lid of the eye and makes an examination. If the particle of metal has merely lodged on the eye, a whittled stick in his skillful hands serves to remove it; but not unfrequently the particle has come with such force that it has imbedded itself in the substance of the eye. Then the magnet is brought to bear, one of its poles being brought in close proximity to the eye. Often this method of treatment is sufficient, and the offending mote is coaxed from its place. But sometimes it is so imbedded in the cornea that it is necessary to cut it out, as a splinter is removed from the skin of any part of the body. This is done with a sharp penknife blade, and, of course, requires great skill and steadiness of nerve in the operator. Such an operation appears to be quite risky, and possibly some educated medical practitioners would object to the use of such apparently brutal means; but there are many men to be found in our shops who do not hesitate to undertake these critical cases, and generally with success. We have known instances where a particle of steel imbedded itself so deeply in the eye that when fairly *cut* out it left quite a scar in the substance of the organ, which was closed only by gradual healing, as would be a wound on the finger.

OXYGEN GAS FROM MANGANESE AND SODA.

In No. 12, current volume of the SCIENTIFIC AMERICAN, page 185, we published a description of a process of extracting oxygen from alkaline manganates discovered by two French chemists, MM. Tessié du Môtay and Maréchal, by which they proposed greatly to intensify the light obtained from ordinary illuminating gas, and, at the same time, reduce its cost. The process was quite fully described in the article alluded to, but having had an opportunity a few days ago of witnessing an exhibition of the quality of this new gas for illumination, compared with that furnished by the gas companies of this city, it may be well to briefly re-state the process.

Manganese, or rather its oxide as known in commerce, together with soda or another alkali, is placed in a retort, subjected to a heat of about 850° Fah., and decomposed by a jet of steam, which liberates the oxygen and deposits it in a suitable vessel. The steam is condensed and a current of atmospheric air directed against the manganates, which are thus regenerated and may be used indefinitely without sensible loss.

Manganese when exposed to a red heat yields half an equivalent of oxygen, and this gas can be more cheaply evolved from it than from any other substance. It is well known that hydrogen gas alone is not an illuminator; it needs oxygen and carbon; but hydro-carbons give out also a very great degree of heat, so that the gas jets in a room increase the temperature so rapidly that it is easily perceptible. But in the experiment alluded to it was manifest that the heat evolved from the oxygenated street gas was much less than that from that gas as ordinarily used. This is a point quite favorable to the new process. The quality of the light, also, was very clearly shown by comparison. Side by side a light furnished by ordinary gas showed a yellow color while that from the oxygenated gas was of a brilliant white, casting as distinct shadows as sunlight and having no more effect on colors It is claimed that this light is sixteen times more powerful than that from the ordinary gas.

Still, it seems that there are some objections to the use of this improved gas, as the oxygen should be conducted by mains or service pipes to the point of consumption in a pipe separate from that conveying the hydrocarbon, as the commingling of the two gases before ignition is more or less dangerous. Again, the two gases are led to the burner itself by two separate pipes which, of course, involves a complication of parts of the gas fixtures which is always to be avoided; and the use of magnesium tubes which are ignited by the flame. They are made by being powerfully compressed. These are objections, but they may be overcome by possible improvements in the details of the apparatus.

The American agents for this improvement are Sterns, Stevens & French, 22 Nassau street, this city, where the process may be witnessed.

THE POLYTECHNIC ASSOCIATION.---ITS USEFULNESS AND ABUSE.

We have heard some complaints expressed in regard to the motives which led us to criticise the exercises at the Polytechnic Club of the American Institute [see pages 297 and 309 current volume]. The criticism in question was simply suggested by a perusal of the notes of a reporter, whom we had employed to be present at the meetings and who was often there during the last season, although no use was made of his notes until now. Our only aim was improvement, which is always the result of fair, sound, and honest criticism; we wished to reform, if possible, at least to influence the transactions of the Association in a direction which would be as gratifying as now sometimes it has been deplorable. It should be kept in view that the Polytechnic Club of the American Institute should be a leading beacon in the metropolis of the Western Continent, where conceited, visionary, or ignorant persons never should perform a prominent part. We do not wish that the free discussion there should be stopped, or that no other voice should be heard than that of regularly appointed lecturers, or the exclusive reading of papers, which sometimes is very tedious any where; we do not mean to say that the exercises should be like the religious exercises in a church on Sunday, where only one person has the exclusive right of speaking; on the contrary, in science, we are strongly in favor of the system of free discussion as established in the Polytechnic Club, where every person has the privilege of propounding questions or giving his opinion; we wish only that the administration should do the utmost to prevent the leading part to be performed by the arrogant, visionary ignorant, or self-conceited persons whose performances we criticised in the articles already referred to.

Nor do we object to the exhibition of new inventions before the members of the Club; no doubt they like to be posted on those subjects. But then it should be seen to that the inventions exhibited always possess the merit of usefulness, ingenuity, or novelty, in order to deserve the distinction of occupying the time of the audience; and also that a competent person be present to explain properly all details, and answer questions in regard to them. As it is, sometimes insignificant or old objects have been allowed to be brought before the Club, and occasionally the person in charge was entirely ignorant of the essential parts of an interesting object he brought on exhibition, and could not answer proper questions in regard to it.

We are happy to state that our criticism has a salutary effect, that it stimulates the truly scientific, practical, and common-sense men (of whom there are scores in our metropolis) to come forward and give to the public assembled at the Club meetings the fruits of their study, the results of their experience, and the conclusions of their judgment. The principle aimed at by the Polytechnic Club is an elevated, a noble principle: it is to diffuse learning and information, to make superior knowledge free to all—free as the air we breathe; and as knowledge is power, thus to increase the power of the nation. Let, then, the administrations of the American Institute go on as they did lately, and give to the men who possess the knowledge and the will to communicate the results of their research, study, or experience, to others, all possible encouragement, and assist them in all possible ways in their endeavors. Let the good things which formerly turned up only occasionally, and lately became more numerous, increase; let inferior things go down, let the Institute raise its standard to a higher level, one worthy of the name it bears.

During the last few meetings a few interesting and useful lectures were given; one by Dr. Van der Weyde on Mineral Magnetism; one by Mr. Raymond, on the necessity of a National School of Mining, and by Mr. Waterhouse Hawkins on Comparative Zoology. One of the best features of the exercises are the scientific notes on new discoveries, read by the talented chairman of these meetings, Prof. Tillman, which often draw out the expression of opinion from members distinguished for their extensive knowledge and versatility, or from others whose opinions are invaluable from their thorough understanding of subjects the study of which they have made a specialty.

"THE WHEEL."

The printing of this novel publication, like many new enterprises, has been a little delayed, but it is expected to be finished and on sale at the news offices by the time this paper is before our readers. THE WHEEL is elegantly printed with large open type, in magazine style, and its contents are really valuable and good. The recent lectures of Professor Tyndall upon Heat, the great prime mover of all forms of physical phenomena, will be found deeply interesting. Every person who desires to be posted in the leading facts and latest developments of scientific truth should be familiar with these lectures. They are presented in popular style, free from technicalities, and abundantly illustrated with engravings. THE WHEEL also contains a variety of letters upon the wheel question, with illustrations, all new. A number of novel problems in science, mechanical, mathematical, chemical, philosophical, and financial, are also presented, together with fresh miscellaneous scientific matter. The price of THE WHEEL is 25 cents. Sent by mail to all parts of the country. Address MUNN & Co., 37 Park Row. Also to be had at the news offices.

TECHNICAL EDUCATION.

Foreign periodicals, more especially English journals, are discussing the subject of Technical Education with great earnestness. Scott Russell, in *McMillan's Magazine*, viewing it from an English standpoint, and Prof. Huxley, through the same medium, are dealing powerful blows at the current systems, and are no doubt assisting greatly to inaugurate reform. *Once a Week*, in an article entitled the "Parisian Workman," compares the British workman with the French workman, and shows that there is a notable difference between them, and attributes it all to the superior advantages which the French workman enjoys from the earliest period of life for the cultivation of taste. To illustrate the tone of the entire article we transcribe the following passage:—

"A great art institution started among such a race, albeit, less urgently needful than in a country like ours, where the proletarian mind is not warmed, or brightened, or refined with the art sense, was certain to get a rapid and wide circulation. Few who know the French public will be surprised to learn the rapid and brilliant progress which has been effected by the *Union Céntrale des Beaux Arts appliqués à l'Industrie*, since it was originated in humble quarters in the famous old Place Royale, early in the year 1864. The Union was the creation of a number of eminent art manufacturers, as M. Guichard (the president), Barye, Carrier Belleuse, Theodore Deck, Gonelle Brothers, Klagmann, Piat, Sauvrezy, etc. It is an independent art institution, that took its rise out of the famous Exhibition of Art Applied to Industry, which was held in the Palais de l'Industrie in 1863. The president, closing the Exhibition, said it should remind the exhibitors of those glorious tropical trees which glow at once with their weight of fruit

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and their wealth of flowers. Four years have not yet elapsed and the Union is already quite an institution, and is putting forth a most notable art educational plan that promises to keep Paris against all comers, the art mistress of the world.

"A college for the cultivation of the beautiful in the useful is an idea that is actually in course of realization. The land is ready, well placed between the Marais and the Quartier St. Antoine, and within stroll of the ruralities of Vincennes. A council of imposing authority is formed,and soon the builders will be at work. The very scaffolding will be a sight worth seeing. What would the Paris carpenter say, if he were brought to contemplate the clumsy array of poles, and planks, and ropes, which the English builder uses? I have under my eye a photograph of the scaffolding that was raised to complete the Louvre. It is as neat and light and regular as our Crystal Palace girders."

Scott Russell speaks of technical education as a "National Want," and quotes at considerable length from the opinions given by many eminent scientists in response to a request for information by the School's Inquiry Commission, of 2d July, 1867, relative to Technical Education.

The following gentlemen were consulted :—Dr. Lyon Playfair, F.R.S.; Prof. Tyndall, F.R.S.; Dr. David S. Price; J. E. M'Connell, C.E.; James Young, chemical manufacturer; J. Scott Russell, F.R.S.; Capt. Beaumont, R.E.; Robert Mallet, C.E.; Rev. Canon Norris, M.A.; Prof. Frankland, F.R.S.; John Fowler, C.E.; Warington W. Smyth, F.R.S.; E. Huth; Peter Graham; A. J. Mundella; and W. Spotten.

Many of these gentlemen were jurors at the Paris Universal Exhibition, and it was in consequence of the fact, that their reports attributed certain cases of inferiority to the deficient technical education of the British people, that the inquiries were instituted by the Commissioners.

The nature of the opinions given by these gentlemen, is sufficiently shown by the following quotation from that rendered by Dr. Lyon Playfair :—"A singular accordance of opinion prevailed that our country had shown little inventiveness and made little progress in the peaceful arts of industry, since 1862. Out of ninety classes there are scarcely a dozen in which a preëminence is unhesitatingly awarded to us. The one cause upon which there was most unanimity of conviction is that France, Prussia, Austria, Belgium, and Switzerland possess good systems of industrial education for the masters and managers of manufactories, and workshops, and that England possesses none."

Professor Tyndall includes the arts of war in his opinion, as will be seen from the following passage from his report to the Commissioners :—"I have long entertained the opinion that in virtue of the better education provided by Continental nations, England must one day, and that no distant one, find herself outstripped by those nations, both in the arts of peace and war."

Mr. Mundella, while claiming that "Englishmen possess more energy, enterprise, and inventiveness than any other European nation," adds, "The contrast betwixt the work people of Saxony and England engaged in the same trade is most humiliating. I have had statistics taken of various workshops and rooms in factories in this district, and the frightful ignorance they reveal is disheartening and appalling." He regards the system of primary and industrial education of Saxony as being much in advance of the French, and says that in the branch of manufacture in which he is largely interested the Saxons are the most formidable rivals of the English.

From the opinions cited and facts which we have here stated, it is evident that England is becoming thoroughly aroused to the necessity of educational reform; and the kind of education which will characterize the new era is sufficiently indicated.

In this race for national art supremacy, we are not content that our own land should be even second, and it is somewhat humiliating to think, that in all the discussions and opinions to which the subject has given rise abroad, that so little allusion to American institutions is to be found. We have no doubt that there is good reason for this, and that our boasted popular education is not so efficient as we are sometimes disposed to believe. That it certainly would not be likely to be selected as a model of excellence by men who are competent to decide in what true excellence in education consists, is to us quite evident. We do not now allude to our primary school system, though we believe it sadly deficient in many important particulars, nor to the higher institutions of learning,inwhich no definite conclusions seem to have been reached as to how far the system of classical education should give place to instruction in modern languages, and the sciences, but to the general facilities for the cultivation of scientific and artistic tastes; libraries comprising the choicest of scientific works, free of access to working men, and open at such times as will accommodate their leisure; public and free art exhibitions, and free lectures on both science and art. Such public libraries as we have, with a few worthy exceptions, are sadly deficient in scientific literature. On a recent visit to a public library, we could find but two scientific periodicals in the reading room, and those were too abstract and profound in their general character to be adapted to popular reading.

That such facilities would be eagerly embraced by the masses, is shown by the success of the Cooper Institute, and other kindred institutions in our own metropolis. The evening schools have proved a priceless boon to such as could avail themselves of their advantages. We hear of local schools of design springing up in inland cities, thronged with eager applicants. Notwithstanding these indications of the great demand for technical education, the general government remains inactive, and leaves to the private beneficence of such men as Cooper, Cornell, and Peabody, or to such limited action as lies in the power of local Commissions and Boards of Public Instruction, the burden of its supply. A consideration of the future, as well as the present needs of the country in this respect ought not to be longer deferred, if our nation is to fulfill the destiny that its founders hoped and predicted for it, and to which the native intelligence of its people and the extent of its natural resources entitle it.

Editorial Summary.

SCIENCE FOR THE PEOPLE.—The Legislature of Massachusetts have under consideration the subject of making an appropriation from the commonwealth to Prof. Agassiz' Museum of Comparative Anatomy, at Cambridge, in order that the institution may be made a grand instrument of popular education. While advocating his claims before a committee appointed to visit and examine the collection, Prof. Agassiz stated that the British museum had expended $250,000 for new specimens not nearly so valuable as those obtained by the Cambridge society at the moderate cost of $15,000. The rarest specimens he had obtained at no expense but that of exchange. Merchant ships have carried his alcohol cans all over the world and brought back, without cost, very valuable specimens. Fishermen and sea captains have for years worked gratuitously for the museum, enriching it with the most valuable contributions. The sympathy with and interest in the pursuits of science which here, pervade all ranks of society, have no existence in Europe.

NEW USE FOR THE INJECTOR.—In Paris, proprietors are by law obliged to clean or renew the fronts of their houses at least once in ten years, and the process is quite a business in itself, giving profitable employment to a small army of workmen. But the introduction by M. Nivert of a plan for making use of the Giffard injector for the purpose, bids fair to work a revolution in the trade. By throwing streams of hot or cold water through hose furnished with fire-engine nozzles, the work is done economically, perfectly, and with dispatch; a five-story building, sixty feet long, being thoroughly cleaned, even to all its architectural details, in a day. Such is the efficiency of the apparatus, as employed for this purpose, that an English company, the "Patent Steam Renovation Company," propose giving to the property owners of smoke-begrimed London the opportunity of having their buildings submitted to a like salutary ablution.

DESPOILING THE "BIG SHIP."—The long series of trials and tribulations which the much-to-be-commiserated owners of the Great Eastern have been called upon to bear, have been duly recounted in these columns. But the misfortunes of the "big ship," it would seem, are to end only in its final annihilation. Our latest foreign exchanges have an account of the disposal by auction of all the steamer's furniture and fittings, under a bill of sale held by a leading firm in Liverpool and a heavy creditor of the company. As to the future destiny of the Great Eastern, it is not difficult to foretell. At present she lies nearly high and dry in the Sloyne, a useless hulk fit only for barnacles. Her owners are without funds to fit her for sea, her value as a gift is on a par with that of the celebrated "white elephant," and her inevitable fate must be her speedy demolition, for her materials and engines.

SINGULAR OSCILLATION OF TEMPERATURE.—Just before the outbreak of Vesuvius in September of last year, a most sudden depression of temperature occurred, which was noted by Prof. G. A. Pasquale. During the month the thermometer had stood remarkably high, equaling the heat of the preceding July and August, the maximum noted during several days being no less than 32° Cent., when on the 26th and 27th, with a deluge of rain and a tempestuous wind from N. N. E., the atmospheric temperature suddenly fell 22° Cent., the thermometer standing at 10° Cent.

A REMARKABLE BOOK.—Under the title, "Stenography and Phonography, or to Write as you Run," a pamphlet has appeared in England, written by the philologist, Dr. K. P. Ter Reehorst. This author attempts to show how the same principles of short-hand reporting may be applied to the 3,065 languages extant, and proposes to teach the student how to record the utterances of a speaker regardless of the language he may be using. Although the attentive pupil, following the direction of the doctor, may learn how to write as he runs, our informant fails to say whether or no "he that runs may read," certainly a very desirable object, and one not so easy attainable, as every novice in the mysterious art of tachygraphy can testify.

THE SOLAR ECLIPSE, on the 18th of August next, is already attracting great attention abroad. The phenomenon of a total obscuration is of rare occurrence, and as it can be observed to advantage in India, the astronomers will not allow this opportunity for making several interesting and valuable observations to pass disregarded. The Indian Government has made great preparations for obtaining a photographic record of the phenomena presented during the eclipse, and the time of its duration—over six minutes—will be long enough to take a large number of negatives, so that much information respecting the physical constitution of the sun may be obtained.

METEOROLOGICAL registers conclusively show that contrary to the belief that the appearance of the aurora borealis portends a storm, the appearance of this phenomenon is as often followed by fair weather as by foul.

THE daily amount of water raised by evaporation from the sea has been computed to be no less than 164 cubic miles, or about 60,000 cubic miles annually.

SOLAR HEAT AS A MOTOR.—An English engineer proposes employing solar heat in generating steam. By using a lens of small diameter, the sun's rays have been concentrated in a vessel containing water, to such a degree that enough steam has been generated to drive a small engine. Increasing the size of the lens will, he contends, have the effect of still further intensifying the solar heat, and the power that may be obtained is only to be limited by the dimensions of apparatus employed. Should the plan of this engineer be generally adopted, the old proverbial injunction for promptness will take a mechanical turn, "make steam while the sun shines," instead of its original agricultural significance.

LUBRICANTS.—Mechanics have always supposed that animal oils were the best, if not the only proper lubricants for machinery. We have used crude olive or Gallipoli oil with good results, except that the acid generated by it acted on the brass; yet we are told by a prominent mechanic that castor oil, although vegetable, has been tested and found to be efficient, and superior to any other oil where the test was rigid and exacting, as on bearings not constructed properly to meet the demands of weight and velocity. Under such circumstances, our informant says that this vegetable oil, at ordinary temperatures viscid and heavy, became sufficiently limpid, and also held to the journals when other oils ran like water.

MUSIC FROM NOISE.—A curious instrument has been exhibited before the Academy of Sciences, which is called by its inventor, M. Daguin, an "analyzing cornet." What we describe as noise is of course made up of an infinite number of musical notes, and these the cornet is designed to analyze, just as a prism separates a ray of white light into its colored components. In appearance the instrument is described as resembling a trumpet, having a nozzle to fit into the ear instead of a mouth piece, and furnished with holes like a clarionet. Provided with one of those instruments, the roaring of a cataract or the howling of the winter's blast, may be resolved by the listener, skilled in the necessary fingering, into the softest melody, which is heard only by himself, certainly a delightful but selfish species of enjoyment.

THE FERMENT IN SALERATUS has been made a subject of investigation by M. Le Ricque de Mouchy. In a published note he asserts that in all unfiltered, concentrated solution of the commercial bicarbonate of soda which he has yet examined, the microscope has revealed very small moving corpuscles, commonly designated molecular granulations. These vegetable cells can only come from the atmosphere, where they were in suspension, since it is not reasonable to believe that any organized matter could withstand the high temperature to which soda is subjected during its manufacture. These corpuscles are the ferments, their action varying with the surrounding matter; in certain cases they are producers of alcohol.

AN ENTOMOLOGICAL MENAGERIE.—We see it stated that an exhibition of living insects is about being established in the new public garden which is being formed at Montsouris, in the outskirts of Paris, and M. Hamet, professor of agriculture at Luxembourg, is directed to draw up a report on the subject for the municipal council. There can certainly be no loss for subjects for such a collection, as entomologists have recognized about 80,000 species. Out of this number must be excluded the microscopical creatures and the parasites, which could not be exhibited alive.

THE LARGEST CHILLED ROLL IN THE WORLD.—Pittsburgh, Pa., has certainly taken the lead of all other cities in the United States, in the matter of manufactures. At the present writing we have to record the casting of the largest known chilled roll, by Messrs. Bollman, Boyd & Bagaley, of that place, its diameter being 28 inches. This is by far the largest chilled roll yet made. We understand it was purchased by Alex. C. Durben, Esq., for the North River Iron Works, Jersey City, and is to be used in rolling copper.

THE quickest passage ever made by a sailing vessel between America and France has just been accomplished by the ship *Mercury*. She left New York on the evening of April 9th, and arrived at Havre on the morning of the 22d. The voyage thus occupied some hours over twelve days. Sixteen days has been hitherto considered remarkably quick time.

IF we expect good workmen we must have educated apprentices. In every business but that of mechanics a proper preparation is expected and exacted. Let our mechanical apprentices be compelled to pass a suitable examination after a suitable training and we shall have good workmen.

BELTS should be kept clean as well as oiled. The continual stretching and contraction of the leather as it runs, admits and retains particles of dust which cut and disintegrate the substance of the belt. Keep your belts well brushed or swept.

IT is a common mistake with machinists to suppose that a cold chisel or center punch will stand better if the edge is "stunt" than if it is thin. Much depends upon the temper of the steel, but more on the using of the tool.

MERCURY conducts heat more slowly than any other metal. If the heat-conducting power of silver is at 100, that of mercury is only 3·54, or about twenty-eight times less than silver.

IF the air of a crowded apartment is conducted through water, so much animal matter is collected in the water as to occasion a speedy putrefactive fermentation, with a disgusting odor.

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Electrical Separation of Gold and Other Metals.

John Corson, of Washington city, has lately patented the following :—

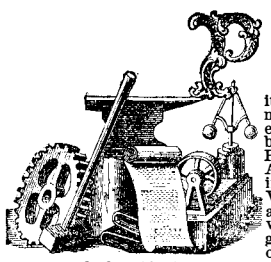
He uses two machines, auxiliary to each other, in order to complete the process of crystallization and amalgamation of the metals found in the ores. Both machines must be insulated from earth currents by glass pillars or globes, or other poor conducting substance. The crystallizer consists of a tub or pan, of wood or iron, of suitable size (say eight or ten feet in diameter and two or three feet high); the pan, if of wood, having a false bottom of glass, one and a half or two inches thick, or of well burned and glazed tiles. A glass shaft is used to propel the mixing wheels, or any other means as effectual, to insulate the pan from earth currents, and four or eight arms, attached to and driven by the shaft, carry the mixing wheels through the pulp. The latter are made of wood, twenty-four to thirty inches diameter, and two to three inches thick, fastened to the arms by any suitable device. The face of the wheels is covered with a metal tire, one half the number with one kind of metal, as copper, and the other half with a different metal tire (zinc), so that when arranged in the pan they will be in pairs.

The tires of different metals are connected by a metallic rod, having at each end a small friction roller, of same metal, resting on the tire of the wheels, thus forming a metallic connection between the upper side of each pair of wheels. When a proper conducting fluid, as salt, or very dilute acid, is placed in the pan, the battery is ready for operation.

To put this pan in use as a crystallizer: First, the raw ore, reduced to an impalpable powder, is put into the pan, and to it is added a proper amount of salt or dilute acid, rendering it a semi-fluid pulp. As soon as any one pair of wheels are wet with this fluid compound, electricity is generated, and currents are established between each pair of wheels, causing crystallization immediately to commence. A slow motion is now given to the wheels, by means of suitable gears or belts, and continued until the operation is completed. The time occupied in each operation will vary with the various kinds of ore, but from six to eight hours will be found sufficient.

After crystallization has been completed in the pan, the whole mass is drawn off and put into the amalgamator, made of a wooden or iron cylinder, or barrel, of suitable size, running on a hollow shaft. The pulp being introduced into the barrel through a suitable opening, with the proper quantity of mercury. The amalgator is closed perfectly tight, and is rotated by very slow motion, by belt or otherwise, for from four to six hours.

After the amalgamation is completed, the amalgam is separated from the pulp by the introduction of a stream of water. The pulp being run into cisterns running lengthwise, east and west, a plate of suitable metal is put in each end, and these plates connected by a wire outside the cistern. Here it is to remain as long as convenient, or as long as any remaining metals crystallize. The mass may then again be subjected to the action of mercury in the amalgamator.



PATENTS

The First Inquiry that presents itself to one who has made any improvement or discovery is: "Can I obtain a Patent?" A *positive* answer can only be had by presenting a complete application for a Patent to the Commissioner of Patents. An application consists of a Model, Drawings, Petition, Oath, and full Specification. Various official rules and formalities must also be observed. The efforts of the inventor to do all this business himself are generally without success. After a season of great perplexity and delay, he is usually glad to seek the aid of persons experienced in patent business, and have all the work done over again. The best plan is to solicit proper advice at the beginning.

If the parties consulted are honorable men, the inventor may safely confide his ideas to them: they will advise whether the improvement is probably patentable, and will give him all the directions needful to protect his rights.

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Issued by the United States Patent Office,

FOR THE WEEK ENDING MAY 19, 1868.

Reported Officially for the Scientific American.

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77,945.—HORSE POWER.—Hiram Aldridge, Goshen, Ind., and Willis Bedford, Chicago, Ill., assignors to Hiram Aldridge.

We claim, 1st, In combination with a stationary or mounted horse power, a vertically adjustable shaft, E, which is provided with two or more pinion spur wheels, for the purposes and substantially in the manner described.

2d, The vertically adjustable shaft, E, with two or more pinions upon it, in combination with sliding or compensating knuckles or couplings, F, or their equivalents, substantially as and for the purposes described.

3d, In combination with a shaft, E, which is made vertically adjustable, and also longitudinally adjustable, the adjustable collars, l l, substantially as described.

4th, The triangular L-shaped cast frame, C C', constructed substantially as and for the purposes described.

6th, The combined arrangement of the driving pinions, G G G, radial shafts D D D1, bevel wheels, c c c', arranged upon a triangular frame, C C', substantially as described.

77,946.—STRAP FASTENER.—J. B. Armstrong, Corunna, Mich.

I claim, 1st, The cam, E, provided with the angular edge, F, and stem, J, with the spring, I, operating substantially as described, for the purposes set forth.

2d, The combination and arrangement of the cam, E, the recess, H, the spring, I, with the frame, A, the hook, B, the cross bar, C, the strap bolt, D, and the bolt, G, all operating in the manner specified, and for the purposes set forth.

77,947.—TRUSS.—Samuel Ayres, New York city.

I claim, 1st, Connecting the pad of a truss with the band or strap by a loop, F, through which the belt slides loosely, substantially as described.

2d, Making a truss pad of cork, substantially as described.

3d, The flange, E, around the edge of the pad, substantially as described.

77,948.—GOVERNOR FOR STEAM ENGINES.—Chas. H. Bacon (assignor to himself and William Read, Jr.), Boston, Mass,

I claim the combination of the propeller and shaft, a b, working within the cylinder, A, constructed with one or more chambers, B C, with the link, E, crank, c, and rod, d, substantially as and for the purpose set forth.

77,949.—DITCHING MACHINE.—Emory Barnes, Chelsea, Mich.

I claim the combination of the sills, Y, the posts, B, the crosstree, C, the beam, B, the braces, A2, the vertical shaft, D, pulleys, E G and H, the chain or rope, R, winch lass, V, lever, W, block, F, crane, I, bolt, 2, lever, J, scoop, K, platform, U, capstan, V, lines, P S N T and Q, crossbar, M, blocks, O, and rope, X, when arranged, constructed, and operating substantially as and for the purposes herein set forth and shown.

77,950.—FURNACE FOR ROASTING ORES.—Nathan Bartlett, Centerville, N. J., assignor to himself and Franklin Osgood, Richmond county, N. Y.

I claim, 1st, The sectional arrangement of the oven, and the breaks or openings by which the sections are coupled or united together, constructed and operating substantially as described.

2d, The combination of the sectional oven with a furnace and chimney, constructed and operating substantially as described.

3d, A sectional oven, as herein described, in combination with openings or doors in both ends of each section of such oven, for the purposes stated, constructed substantially as described.

4th, Constructing a sectional oven with the sections alternately inclined to each other, for the purposes stated, arranged and operating substantially as described.

5th, The arrangement and combination with each other in pairs of the sectional ovens, the furnaces, and the chimneys, in the manner and for the purpose substantially as described.

77,951.—MACHINE FOR CUTTING ECCENTRIC TAPS.—Benj. F. Bee, Harwich, Mass., assignor to the New York Tap and Die Company, New York city.

I claim, 1st, The combination in one machine of the following instrumentalities, viz., the rotating mandrel to support the blank, vibrating rotary cutter, inclined cutter arbor, feed screw, and regulating cam, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

2d, The combination in a machine of the following instrumentalities, viz., the rotating mandrel, rotating cutter, mounted on a free arbor, cutter guide, and spring, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

3d, The combination in a machine of the following instrumentalities, viz., the rotating mandrel, rotating cutter, inclined cutter arbor, regulating cam, and weight, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

4th, The combination in a machine of the following instrumentalities, viz., the rotating cutter, regulating cam, and adjustable connecting mechanism, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

5th, The combination in a machine of the following instrumentalities, viz., the regulating cam, vibrating tool support, variable connecting mechanism, and a directing instrument, formed and constructed to adapt them to the purpose to be accomplished, and all combined and operating in the machine substantially as before set forth.

77,952.—VULCANIZING INDIA RUBBER CAR SPRINGS AND OTHER ARTICLES.—Henry W. Beins, Mount Vernon, N. Y.

I claim the molds, b, secured in the heads or plates, a of the heater, and having their ends extending beyond such heads or plates, substantially as and for the purpose set forth.

77,953.—HERMETICALLY CLOSED AND KEYLESS PADLOCK.—S. Bickerstaff, Cincinnati, Ohio.

I claim a self-sealing or keyless padlock, consisting of two pieces only, the body and the shackle, and constructed without rivets, bolts, screws, or opening of any kind, except for the reception of the shackle, substantially as shown and described.

77,954.—PACKING FOR JOINTS OF STEAM AND WATER PIPES. Hyppolyte Brocard, Paris, France.

I claim the employment, as means of making the joints of metal pipes and other metal articles tight, of washers or packings of lead, rolled, substantially in the manner hereinbefore described

77,955.—BUCKLE.—S. P. Burdick, New York city.

I claim, 1st, The lip, e, turned up from the lower face of the shell, A, to hold the lever, b, when the cam, a', is fully locked and operating in combination with said cam, shell, and lever and the lip, c, as herein described.

2d, The construction of the shell, A, of a flat plate, having a depressed concave flange, g, at its front edge, substantially as and for the purpose described.

3d, The guide, i, secured to the shell, A, and running crosswise to the belt which is secured in said shell, substantially as and for the purpose set forth

77,956.—GATE.—John P. Butz and Abner McFarland, Enterprise, Ind.

We claim, 1st, The lever, D, with the brace, C, and the slats, a a', used as and for the purposes set forth.

2d, The combination of the lever, D, with the brace, C, and the latch, c, and ratchet bar, g, as and for the purposes specified.

77,957.—TUBE WELL.—O. D. Chapman, Chicago, Ill.

I claim the combination of the bands, d, wire cloth, E, spiral wire, F, and perforated plate, G, with tube, A, substantially as and for the purpose set forth.

77,958.—BOOKBINDERS' BEVELING MACHINE.—Wm. P. Chase, Boston, Mass., assignor to R. Hoe & Co., New York city.

I claim, 1st, The reciprocating plane, provided with an oblique cutter, in combination with the oblique groove, to guide the plane in its travel, whereby I am enabled to obtain a smooth shear cut of the material, as set forth and specified,

2d, The combination with the oblique groove and reciprocating cutter, of the adjustable plate, B, for holding the material for the action of the cutter, substantially as set forth and specified.

3d, The combination with the oblique groove and reciprocating cutter, H, of the adjustable bed, D, for giving any desired bevel to the material, substantially as set forth and specified.

4th, Making the face of the cutter or plane, H, concave, in combination with the oblique cutting iron, I, whereby I obtain a clean, smooth cut, without abraiding the material, suostantially as specified.

5th, The combination and arrangement of the oblique guides, C C, reciprocating plane, H, holding plates, B B, and adjusting plate, constructed and operating substantially as set forth and specified.

77,959.—LUBRICATING OIL.—Robert A. Chesebrough, New York city.

I claim the product or article called by me Filtrene, as a new article o manufacture.

77,960.—HEEL CORK.—Geo. F. Clemons, Springfield, Mass. Antedated May 15, 1868.

I claim, 1st, A heel cork adapted to be self-securing to the boot by means o spring clamping surfaces, substantially as described.

2d, The releasing lever, g, when employed substantially as described and for the purposes set forth.

77,961.—RAFT DOG.—C. C. Comstock, Grand Rapids, Mich.

I claim the combination of the two wedges, A A, the link, C, and the rope, B, when employed together in the manner as and for the purpose set forth.

77,962.—COAL STOVE.—Thos. Crane, Fort Atkinson, Wis.

I claim, 1st, A single-cylinder drum stove, provided with an annular flue jacket, H, surrounding its upper portion, and communicating with the fire chamber by means substantially as described.

2d, The means shown and described of compelling the products of combustion leaving the fire chamber, A, to circulate entirely around the suspended jacket, H, when this jacket is arranged and applied to a stove substantially as described.

3d, A flue jacket, H, made shorter than the fire chamber, A, and adplied to said cylinder so as to form an air space, J, which leads through the perforated top, P, substantially in the manner and for the purpose described.

77,963.—UMBRELLA.—William Damerel, Brooklyn, N. Y.

I claim, 1st, The conical collar, f, connected to the runner, c, by means o links, h, substantially as and for the purpose set forth.

2d, The cam, e, on the spring hook, d, arranged to operate with the collar f, substantially as described.

3d, An umbrella stick made of an inner and outer tube united throughout their length, substantially as described.

4th, The bridge piece, i, applied within a tubular umbrella or parasol stick substantially as described.

77,964.—LOOPED PIN FOR SECURING ARTIFICIAL TEETH.—C. H. Eccleston, Oxford, N. Y.

I claim an angular loop for securing artificial teeth, when made with an enlarged and flattened head, provided with projecting shanks whose outer ends are bent at an angle therewith, all substantially in the manner herein set forth

77,965.—BRAN DUSTER.—Peter T. Elting, Buffalo, N. Y., assignor to Elting Bolt and Duster Company, Cincinnati, Ohio.

I claim, 1st, The fan wings, J4, revolving within the chamber, J, and extending downwardly and outwardly beyond the periphery of the screen disk, as and for the purpose set forth.

2d, The combination of the serrated scouring plate, at the eye of the screen disk, with the surrounding screen cloth, as and for the purpose set forth.

3d, Making the screen frames in sections, as and for the purpose set forth

4th, Supporting the brush tempering wheel at two points by the brush adjusting screws, and at a third point by the screw post from the flour chamber, for the purpose described.

5th, The brackets, K, with their adjusting screws, K1 K2, for adjusting the flour case laterally and vertically, as set forth.

77,966.—REVERSIBLE KNOB LATCH.—Barthel Erbe, Birmingham, Pa. Antedated May 12, 1868.

I claim the hook, n, in combination with the depression, l, on the latch arranged and operating as described, for the purpose set forth.

77,967.—FENCE.—O. J. Everson, Lake City, Minn.

I claim connecting and adjusting the panels of a portable fence together by means of the pin, e, and the stay brace, C, constructed and used with the panels, in the manner and for the purpose set forth.

77,968.—CAR AXLE.—Wm. B. Fahnestock, Lancaster, Pa. Antedated May 16, 1868.

I claim the plate, D, constructed and operating as described, in combination with a divided axle, as specified and for the purpose set forth.

77,969.—MOLD FOR MAKING DRAIN TILE.—Henry Felthoff and Lucas D. Tingley, Prince William, Ind.

We claim the arrangement of the molds, B and C, with pin, p, and elongated slits, b b, substantially in the manner and for the purpose as herein shown and described.

77,970.—CONSOLIDATING COAL DUST FOR FUEL.—William Footner (assignor to Wm. J. Footner), Chicago, Ill.

I claim consolidating particles of coal by mixing with a solution of glue, and compressing, substantially as and for the purposes specified.

77,971.—MANUFACTURE OF PLATED SPOONS, FORKS, ETC.—H. E. Fowler and W. W. Holmes, Wallingford, Conn. Antedated May 4, 1868.

We claim the improvement in the manufacture of spoons, etc., from iron, substantially as herein described.

77,972.—CREASING APPARATUS FOR SEWING MACHINES.—H. W. Fuller, New York city. Antedated May 5, 1868.

I claim, 1st, The mode, substantially as described, of conveying motion to the creaser or marker.

2d, The combination of the means herein described, or the equivalent thereof, for giving motion to the marker, with a marking device having a fixed fulcrum of vibration, as and for the purpose specified.

3d, Placing the set screw for the adjustment of the said lever at the center of said fulcrum, for the purpose stated.

4th The combination with the lever having a fixed fulcrum or center of motion, of a spring which may be adjusted in elasticity or power relatively with said fulcrum.

5th, The arrangement of the spring with respect to the lever and its fulcrum, so that the act of adjusting the lever, long or short, will also adjust the power of the spring, substantially as and for the purpose specified.

6th, So attaching the points to the lever which carries them, substantially as described, that they may be readily detached and renewed, or others substituted, as specified.

7th, Guarding and protecting the points by a movable rest, substantially as set forth.

8th, The combination with such rest of a removable key, to regulate the spread of the points, for the purposes specified.

77,973.—HORSESHOE CALKING VISE.—Geo. L. Gerald, Thorndike, Mass.

I claim a calking vise having the dies, a and b, with the shaping devices hereinbefore described formed thereon, said dies, a and b, being opened and closed by means of the lever, k, link, l, and springs, w, all constructed and operating substantially as herein described and for the purposes specified.

77,974.—LUBRICATOR.—E. F. Gerdom and C. W. Schindler, Albany, N. Y.

We claim, 1st, The stop, e, in combination with the tubular conductor, D, leg, B, and top of cup, A, substantially as and for the purpose set forth.

2d, The disk, f, and spring, g, in combination with the stop, e, and tubular conductor, D, of the cup, A, substantially as and for the purpose described.

77,975.—UMBRELLA.—G. G. Griswold, New York city. Antedated March 12, 1868.

I claim, 1st, The combination, with a notch or crown piece or runner for umbrellas or parasols, having an annular groove and radial slots in it for the ends of the ribs or stretchers to work in, of a ring or rubber, or other suitable elastic yielding material, for fastening said ribs or stretchers in said groove, while at the same time one or more of the said ribs or stretchers may readily be removed for repairs, substantially as set forth.

2d, The combination, with a notch or crown-piece or runner of an umbrella or parasol, having an annular groove and radial slots in it for the ends of the ribs or stretchers to work in, of a metal, leather, or other suitable ring for fastening said ribs or stretchers in said groove, said ring having one or more slots in its side to permit of the introduction or withdrawal of one or more of the ribs or stretchers, substantially as set forth.

3d, The combination, with the runner, E, of the spring catches, G G, operated in part or wholly by the india-rubber or other elastic ring, I, substantially as set forth,

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77,976.—SANDAL.—Wm. Hall, Georgetown, Ill.
I claim the bars,spurred and affixed to the bottoms of the sandals or other covering for the feet.

77,977.—HUB FOR CARRIAGE WHEELS.—Harvey D. Haraden, Hartford, Vt.
I claim the improved supporter, A, or arrangement of disks, socket rings, or radial connections, as set forth.
Also, the combination and arrangement of the two separate cylinders or pieces of wood, B B, with the disks, the socket rings,and these radial connections, arranged together and cast in one piece, as set forth.

77,978.—LOW-WATER INDICATOR.—T. C. Hargrave and W. B. Charlton, Boston, Mass.
We claim the arrangement of the pipe, I, expansion tube, H, provided with the cock, G, arm, F,adjustable weight rod, D, in connection with the lever,C, and whistle, B, substantially as and for the purpose set forth.

77,979.—PAD FOR HORSES' HOOFS.—John Haseltine, Methuen, assignor to Chas. L. Wheeler, Cambridge, Mass.
I claim, 1st, An elastic cushion, constructed substantially as described for the purpose set forth.
2d, The air chambers, formed as described, in combination with the air or vent holes, C, for the purpose and substantially as described.
3d, The narrow flange, B, for the purpose and substantially as described.
4th, The wires, g, or equivalent, combined with the elastic cushion, in the manner and for the purpose substantially as specified.

77,980.—REFRIGERATOR.—J. H. Hollingsworth (assignor to himself, Albert Rementer, and W. C. Russell), Philadelphia, Pa.
I claim coil of pipes, C P, and pipes, C' P', water tank, W, outer and inside boxes, A and B, salt, S S, the whole combined and constructed and operating for the purpose and the manner herein described and set forth.

77,981.—MODE OF SECURING TIRES TO WHEELS.—Wm. H. Hovey, Holly, Mich.
I claim the securing of tire, B, to the rim, A, by inserting between the same parallel bolts, D D, provided with heads or plates, C C, perforated to receive the ends of the bolts, and secured by riveting the same, substantially as described and for the purposes set forth and shown.

77,982.—APPARATUS FOR COLLECTING MARSH AND OTHER GASES.—C. S. Hunt Parish of Terrebonne, and J. B. Knight, New Orleans, assignors to C. S. Hunt, and William F. Pratt, and Peter M. Peterson, New Orleans, La.
We claim, 1st, The chamber, A, or its equivalent, in combination with a gas pipe, C, and a pump, D, when these several parts are constructed substantially as and for the purpose set forth.
2d, The chamber, A, or its equivalent, in combination with a pump, D, and a gas pipe, C, when the latter is partially filled with a hydrocarbon liquid or other agent, for carbureting or increasing the illuminating power of the gas, substantially as herein described for the purposes set forth.

77,983.—ILLUMINATING GAS.—C. S. Hunt, Parish of Terrebonne, and J. B. Knight, Parish of Orleans, assignors to C. S. Hunt, and Wm. F. Pratt, and Peter M. Peterson, New Orleans, La.
We claim the gaseous composition or compound herein described, consisting of marsh gas, commonly so called, and carbon, when the latter is infused or incorporated into the former, substantially in the manner and for the purpose set forth.

77,984.—MATCH-SAFE.—Melvin Jincks, Dansville, N. Y.
I claim, 1st, The rocking floor, B,arranged as described,so as to be tilted by the slide, C, in its withdrawal, and returned to its horizontal position after depositing the match.
2d, The combination of the floor, B, slide, C, and striking hands, D D',when arranged and operating in the manner and for the purposes set forth.

77,985.—CUTTING MACHINE.—William H. Johnson, Springfield, Mass.
I claim, 1st, The combination of a cutter, having a cutting edge of the required form, with a plain hard surface or plate, harder than the cutter, cooperating, substantially as described, as a device for cutting leather, cloth, paper, and other similar material.
2d, The employment, in a cutting machine, of a duplex embossing die, in combination with two corresponding dies or matrices, placed opposite to each other, and coöperating substantially as described, by which two sheets may be simultaneously embossed upon their contiguous surfaces by the same impression.
3d, The employment, in a cutting machine, of two embossing dies, placed opposite to each other, and facing toward each other, in combination with a central plate placed between the same, and coöperating substantially as described, by which two sheets may be simultaneous embossed upon their exterior surfaces by the same impression.
4th, The employment, in combination, of the cutting apparatus described, with two sets of embossing dies, as described, by which the several operations described can be simultaneously performed upon two sheets of material by the same impression.
5th, The combination of the central plate with the two yielding pressers placed on opposite sides of the same, substantially in the manner and for the purpose described.
6th, The method herein described for adjusting the length of the pitman by means of the scarf joint, and the key inserted between the offsets therein, or substantially as described.

77,986.—CUT-OFF VALVE GEAR.—Adoniram Kendall, Buffalo, N. Y.
I claim, 1st, The levers, I I', links, K, and lever, J, as constructed and arranged in combination with the pawls, G, as herein set forth.
2d, The arrangement of the lever, L, in combination with the pawls, G, substantially as herein described.
3d, The arrangement of the oscillating valve, N, and walls, Q', as set forth.
4th, The stop, U or T, as constructed and arranged in relation to the valve, N, and arms, S, so as to operate said valve by the pressure of steam, substantially as set forth.

77,987.—MODE OF UTILIZING TIN SCRAP OR WASTE.—Carl Kuehn, Vienna, Austria, assignor to Joseph R. Von Wessely, New York city.
I claim, 1st, The method herein described of utilizing tinned iron waste by digesting the waste in hot water, in combination with muriatic and nitric acids, substantially as set forth.
2d, The method herein described of collecting the metallic tin from the solution herein described by means of zinc plates immersed therein, and exciting galvanic action, to cause the tin to be deposited on the plates, as set forth.
3d, The method herein described of segregating the tin and the iron by means of heat, water, muriatic and nitric acids, evaporation, crystallization, and galvanic action.

77,988.—TOMPION FOR FIRE-ARMS.—T. T. S. Laidley, U. S. Army. Antedated May 1, 1868.
I claim in combination with a tompion and means for expanding it, a tubular packing, substantially as and for the purpose set forth.

77,989.—STEAM ENGINE.—Henry O. Lothrop, Milford, Mass.
I claim the arrangement with the rods, b4, connecting the pistons, A1 A3, with their crank or driving shaft of the rods, c4 g4, and sliding cross head, e4, connecting the piston, B2, with said shaft, substantially as herein shown and described.

77,990.—MODE OF TREATING LEATHER, CLOTH, AND THE LIKE, TO RENDER THEM WATER AND FIRE PROOF.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the treating of fabrics, substantially as herein described, for the purpose of rendering them water proof, either with or without the addition of the fire proofing ingredients.

77,991.—PLASTIC COMPOUND FOR ROOFING AND OTHER PURPOSES.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the compound produced by the admixture of silicate of soda with vegetable fiber, with or without the addition of sand, clay, and similar substances, and the treating the same with a solution of the chloride of calcium, substantially as described.

77,992.—FIBROUS COMPOUND FOR ROOFING AND OTHER PURPOSES.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the material produced by the union of vegetable fiber, either alone or with sand and similar substances, with silicate of soda, and treated with a solution of alum, or of alum and salt combined, substantially as described.

77,993.—MODE OF PRODUCING FLOOR CLOTH, LEATHER CLOTH, AND THE LIKE.—Robert O. Lowrey, Salem, N. Y. Antedated May 12, 1868.
I claim the production of the new article herein described, as a substitute for oil cloth, rubber, leather, etc., when produced substantially as set forth.

77,994.—TAP FOR CUTTING SCREW THREADS.—Wm. Mantey, New Orleans, La.
I claim in the construction of taps for tapping nuts and the like, obliterating or diminishing every alternate cutting thread, from the point of the tap back to near the termination of the cut portion, but leaving in a space near said terminal portion all the cutting threads full and perfect, as herein described and shown.

77,995.—ARTICLE FOR FOOD FROM POTATOES.—C. K. Marshall, New Orleans, La.
I claim as a new article of manufacture and commerce, a desiccated yam, sweet, or other potato, prepared substantially as described and for the purpose specified.

77,996.—PLOW.—Elbridge G. Matthews (assignor to Frank F. Holbrook), Boston, Mass.
I claim, 1st, The combination and arrangement of the bracket or rest, c, the tenon, h, and the mortised projection, a, with the mold board, D, and standard, A, of the plow.
2d, The combination and arrangement of the duplex-pointed dog, or brace, g, the hooked bolt, e, the nut, f, and the eyes or staples, h h and i, with the bracket, standard, and the moldboard, connected by means substantially as set forth.

77,997.—GAGE.—E. W. Mathewson, Norwich, Conn.
I claim the slotted support, A B, in combination with the shaft, worm-wheel, H, screw, F, and pointer, C, arranged and operating substantially as set forth.

77,998.—CARPENTER'S BENCH DOG.—E. B. McCoy (assignor to himself and R. Cook and Sons), Winsted, Conn. Antedated May 4, 1868.
I claim the screw, C, arranged with its gear, c, and combined with one or more screws, D, of reverse threads, so as to operate together, and the one to bind the other, substantially as herein set forth.

77,999.—TRUSS SUPPORTER.—John McFadden, Cadiz, Ohio.
I claim a truss pad, A, provided with a series of radiating buckles, a b c d e, and acting in combination with the straps, B C D E, substantially as and for the purpose described.
Also, the additional brace, D', in combination with the pad, A, waist strap, B, and thigh strap, D, substantially as and for the purpose set forth.

78,000.—BRIDGE.—Rufus Spaulding Merrill, Boston, assignor to himself, Levi Liscom, and William Lincoln, Brookline, Mass.
I claim the construction of iron bridges, substantially in the manner herein described.

78,001.—PROCESS OF SEPARATING COBALT AND NICKEL FROM OTHER ORES.—Alfred Monnier, Philadelphia, Pa.
I claim the treatment of a solution of cobalt, nickel, iron, and manganese, for the purpose of separating one or both of the two former from one or both of the two latter metals, substantially as herein set forth.

78,002.—KNIFE FOR REMOVING THE SKIN FROM ANIMALS.—George W. Myers, Harleton, Pa.
I claim the combination and construction of the guard, C, that is movable and adjustable with the knife blade, A, as herein described, and for the purposes set forth.

78,003.—WHEEL BARROW.—William F. Newcombe, Cleveland, Ohio.
I claim the application of the iron bridge, to strengthen the front part of a wheel barrow, substantially as shown and described.

78,004.—BLIND SLAT FASTENING.—James M. Peirce, Mokena, Ill. Antedated April 30, 1868.
I claim the use of a fastener or button, A, also the spring, E, and the pin, D, as herein described, to prevent blind slats or blinds from being opened on the outside.

78,005.—MANUFACTURE OF SULPHATE OF ALUMINA.—Henry Pemberton, Allegheny City, Pa.
I claim the employment, in the manufacture of the sulphate and other salts of alumina, of the improved process hereinbefore described.

78,006.—GAS APPARATUS.—John Ponton (assignor to himself and Jacob F. Hayen), Buffalo, N. Y.
I claim, 1st, An automatic machine, substantially as above described, for the purpose of making fixed illuminating gas, which will regulate itself and maintain any desired degree of heat, and supply itself with petroleum or other fluid hydrocarbon, in exact proportion as the gas generated by such machine is used or consumed from the gasometer.
2d, The use of a retort, arranged with an inclination, together with a movable screw, or its equivalent, in the interior, substantially as described, arranged in such a manner that the gas generated from petroleum or other hydrocarbon, will have to travel over the whole interior surface of said retort previous to its being let free.
3d, The application of any mechanical device attached to said retort, in the manner substantially as above described, whereby the expansion or contraction of said retort will regulate the supply of fuel to the furnace.
4th, The application of any pyrometer to any retort, in connection with any mechanical device, which will automatically regulate the supply of fuel to any furnace used in the manufacture of gas.
5th, The application of a gas furnace, substantially as above described, for the above purpose, the chief principle of which consists in utilizing the waste heat of the furnace for the purpose of causing the gas and atmospheric air, which are used as fuel, to be mixed at any high temperature before ignition.
6th, A sub-reservoir in the above connection, substantially as described, the chief principle of which consists in its being hermetically sealed and entirely submerged, and so connected with the retort that the pressure of the gas will drive the oil or other fluid hydrocarbon from the sub-reservoir to the retort, in lieu of atmospheric pressure.
7th, The application of a float valve, substantially as described, in connection with a reservoir, the chief principle of which consists in admitting only sufficient oil to said reservoir as will maintain any fixed level.
8th, In connection with said reservoir, a ball, check, or other valve, substantially as described, the chief principle of which is to prevent the return of any fluid or gas from said reservoir to the main source of supply from any undue pressure in said reservoir.
9th, The application of an air mixer, arranged upon the principle of the old wet meter, substantially as above described, in connection with said apparatus, the chief principle of which consists in having any desired number of compartments, and each compartment having buckets running in one and the same direction, so that air or gas can be admitted to either compartment by a movable piston, or its equivalent, thereby mixing the gas and air in metrical proportions, as required. I do not claim a meter or air mixer in which the buckets are reversed.
10th, That the said mixer may be worked by power other than the pressure of gas, which will then answer the purpose of exhausting the gas from the retort, and relieving it from pressure, as well as mixing the air and gas.
11th, The application of a feed pipe to the retort, substantially as above described, the chief principle of which consists in being totally submerged in cold water to the very point of ingress to said retort.
12th, The application of a spring or other valve, substantially as above described, attached to the said feed pipe, and arranged in any manner similar to that above described, so that the rise or fall of the gasometer will regulate the supply of oil to the retort.
13th, In connection with above apparatus, a tank or tanks, arranged in any manner, so as to protect the different parts of the above apparatus from heat.
14th, A condenser, substantially as above described, arranged in such a manner that the distillate will return to said reservoir.

78,007.—FURNACE FOR MELTING METALS, GLASS, &c.—William P. Prickett, Philadelphia, Pa.
I claim the application, to furnaces, of the base upon which the pots or crucibles rest, and the small apertures opposite each, that lead into the surrounding flue, and from thence into the main stack or chimney, substantially as herein described and set forth.

78,008.—FANNING MILL.—William C. Ray, Pleasant Run, and Gideon Leigh, Clinton Station, N. J.
I claim, 1st, The combination, substantially as set forth, of the cranked fan shaft, the pitman, O, the bell-crank lever, P, which sustains the rear end of the pitman, the laterally-vibrating shaking shoe, D, the longitudinally-vibrating screen frame, G, and the horizontally-oscillating balance lever, S, for the purposes specified.
2d, The combination, substantially as set forth, of a longitudinally-vibrating screen, F, suspended centrally from short radius bars, f, with a longitudinally-vibrating frame, G, suspended at its forward end by long radius bars, g, and hinged at its rear end, f', to the screen, F, whereby an opening and shutting or rising and falling, as well as a longitudinally-vibrating movement, is imparted to the latter, and the grain thereby thoroughly sifted.
3d, The combination, substantially as set forth, with the pitman, O, of the depending bracket, R, the balance lever, S, and the longitudinally-vibrating frame, G, for the purposes set forth.
4th, The removable deflecting board, L, arranged and operating as set forth.

78,009.—SPRING WAGON SEAT.—Adam Reichert, Cogan Station, Pa.
I claim the combination of the ordinary wagon seat, A, of the springs, C, constructed of iron, steel, brass, or other material, of the supports, B, fastened to said seat by hinges, and of the slides, E E, for the purpose of elevating either end of the seat.

78,010.—KNIFE SHARPENER.—Charles H. Reynolds, New York city, assignor to himself and Albert Bridges, Jersey City, N. J., and said Reynolds assignor to Edwin Ray. Antedated May 7, 1868.
I claim, 1st, A knife-grinding machine, having a guide, A3, and file-carrying piece, B, arranged to serve relatively to each other, and to a bed for holding the blade in position, substantially in the manner and for the purposes specified.
2d, The within-described compound bed, a a1 a2 a3, adapted to hold the blades both of knives and scissors, and to allow them to be acted upon by the file, C, or its equivalent, substantially in the manner and for the purpose herein set forth.

78,011.—TRACE FASTENER.—E. D. Rhoads and J. P. Rhoads, Dayton, Ind.
We claim the arrangement of the ferrule, B, with its perforated jaws, h h, and the lever, C, with its spring, D, and pivoted pin, g, said lever being pivoted to the outer end of the ferrule, and curved to the rear of the swingle tree, to operate substantially as set forth.

78,012.—THROTTLE VALVE FOR LOCOMOTIVE ENGINES.—George Richards, Boston, Mass.
I claim the arrangement of an additional or supplementary valve with the throttle valve of a locomotive engine, when both are operated by one and the same lever, substantially as and for the purpose specified.

78,013.—BEARING FOR SPINDLE.—John Richards, Cincinnati, Ohio.
I claim, 1st, The adjustable sleeve, b, in combination with the screw, e, for adjusting the spindle, c, to different positions in the socket, substantially as and for the purposes specified.
2d, The oil cell, n, in combination with sleeve, b, and screw, e, operating together in the manner and for the purposes set forth.
3d, The adjusting screw, d, in combination with the sleeve, b, and screw, e, for adjusting the sleeve, b, and spindle, c, substantially as specified.
4th, The sleeve, b, screws, c and d, together with the lubricating cell, n, when combined and operating in the manner and for the several purposes as specified.

78,014.—DEVICE FOR ROLLING ROOFING.—Edmond Richardson and James H. Cole, Adrian, Mich., assignors to James H. Cole.
We claim, 1st, The method herein described of making sheets of Egyptian case-hardened marble, or sheets of any similar material, by the application of the felting simultaneously with the rolling and pressing of the sheets, substantially as described.
2d, The construction of the rolling instrument shown in fig. 1, having the rollers, A and B, the former being provided with shoulders, m and n, and scrapers, o o, substantially as and for the purposes set forth.
3d, In combination with said instrument, the frame, D E, when provided with the cutters, i i, substantially as described and for the purpose set forth.

78,015.—ANIMAL TRAP.—Thomas L. Rivers, St. Louis, Mo. Antedated May 13, 1868.
I claim the trigger, A, with its rounded shoulders, F F, and catch, C, in combination with the door, as above described and for the purposes set forth.

78,016.—PROCESS OF OBTAINING GELATIN FROM FISH HEADS.—Benjamin Robinson, East Gloucester, Mass.
I claim the process described, for obtaining gelatine from the heads of fish.

78,017.—MEDICAL COMPOUND.—Levi Rogers, Morehouse Parish, La.
I claim the medical compound herein described, when made of the ingredients herein mentioned, in the proportions and by the method stated, for the purpose set forth.

78,018.—MEDICAL COMPOUND.—Levi Rogers, Morehouse Parish, La.
I claim the medical compound herein described, when composed of the ingredients herein mentioned in the proportions stated, and compounded by the method and for the purpose set forth.

78,019.—SAWING MACHINE.—Albert E. Ross, Hollis, Me.
I claim the combination of the slide, o, lever, z, lever, a', cords, q r, spring, 8, and slide, v, as and for the purposes set forth.

78,020.—WATCH, CLOCK, AND LOCK KEY.—Edward C. Ryer, Burlington, Vt. Antedated May 7, 1868.
I claim, 1st, The manner of applying the sleeve, C, to the barrel of an adjustable watch, clock, or lock key, all as herein described and shown, and for the purpose specified.
2d, The ring, A, or its equivalent, as applied to the sleeve, C, all as herein shown and described, and for the purpose specified.
3d, The ring, G, as applied to the barrel, B, all as herein shown and described, and for the purpose specified.

78,021.—MACHINE FOR WIRING PANS.—James Shepard, Bristol, Conn. Antedated May 7, 1868.
I claim the combination of the roller die, D, with the revolving die, A, constructed and operating as described

78,022.—LOADER FOR LOCOMOTIVE TENDER.—A. D. Smith, Grafton, Ohio.
I claim the frame, D, its sustaining rods, f f, the latches, C C, in combination with the box, A, and trap doors, B D all constructed and arranged to operate substantially as and for the purpose set forth.

78,023.—SOLDER FOR ALUMINUM.—Alfred Starr, N. Y. city.
I claim the alloy specified, forming a solder for aluminum.

78,024.—MUSKETO BAR.—Edward Steinel, Amsterdam, N. Y.
I claim the hinged frame, B, and top bar, C, in combination with cords, b, and with a musketo net, substantially as and for the purpose described.

78,025.—CHURN DASHER HEAD.—Benjamin F. Stover and Abram H. Stover, Lodoga, Ind.
We claim the concave head, A, of finely-perforated or reticulated metal having a socket, B, as and for the purposes specified.

78,026.—SPRING BED BOTTOM.—Jay C. Taylor, Ann Arbor, Mich.
I claim the combination of slats, A, buckles, B, rubber springs D, adjustable bar, E, hangers, I, journal, F, and transverse bar, G, when arranged and operating substantially as and for the purposes herein set forth.

78,027.—NECKTIE.—Edwin Thomas, Philadelphia, Pa.
I claim, as a new article of manufacture, a necktie, composed of sections of material of different colors or quality, said sections being detached from each other, substantially in the manner specified, and for the purpose set forth.

78,028.—SALT AND SUGAR EVAPORATOR.—Joseph M. Thompson, Rome, N. Y.
I claim the admission of air by jets into the flame under the pots or pans, at points equidistant from each other.

78,029.—ANIMAL TRAP.—James Trainer, Vinton Station, O.
I claim, in combination with a trap, having the above-named devices, the tilting platform, d, arm, K, crank, l, and the described connections, all arranged to operate in connection with the levers, e e', as and for the purpose set forth.

78,030.—GUN CARRIAGE.—Charles S. Tyson, Old Point Comfort, Va.
I claim, 1st, A mechanism for taking up the recoil of heavy guns, consisting of a spring or springs working against or between inclined surfaces, so that the spring or springs will be more and more compressed as the carriage runs back, opposing a regularly-increasing resistance to the recoil force, substantially as described.
2d, In combination with the springs, C C, and the inclined bars, B B, the crank, E, on the forward axle of the carriage, the link bar, e, and the hinged coupling of the springs, all constructed, arranged and operating substantially as described.
3d, In combination with the inclined bars and springs, the intermediate sliding bars, I I, as and for the purpose set forth.
4th, In combination with the side rails of the carriage pressing against the outer sides of the bars, B B, and the cross bar, G, and plates, g g, pressing against the upper and lower sides of said bars, and the springs, C C, said bars, B B, with their outer, upper, and lower sides parallel, and their inner sides inclined, substantially as and for the purpose set forth.
5th, In combination with the inclined bars, B B, springs, hinged coupling, and intermediate sliding bars, substantially as described, the transom plates, D and D', to hold all the parts in place, as set forth and described.

78,031.—SUBSOIL PLOW.—John Vaughn, Miami county, and Eli Chamness, Grant county, Ind.
We claim, 1st, The construction and arrangement of the wheel, B, substantially in the manner and for the purpose as herein set forth,
2d, The combination of the frame, A, and dash board, d, with the wheel, B, substantially in the manner and for the purpose as herein set forth.
3d, The combination of the plow, D, with the wheel, B, substantially in the manner and for the purpose as herein set forth.
4th, The combination of the jack or cleaner, C, and frame, A, with the wheel, B, substantially in the manner and for the purpose as herein set forth.

78,032.—METALLIC TAG FOR STRAPS.—Edward Wadhams (assignor to himself and A. Wadhams), Yorkville, N. Y. Antedated Dec. 28, 1867.
I claim, as a new article of manufacture, a tag for straps, consisting of the metallic plate, B, when provided with the two rectangular openings, a, and strips, b, and adapted to be bent over the end of the strap, as herein set forth for the purpose specified.

78,033.—COMPOSING STICK.—John L. Wait, East Cambridge, assignor to himself and George J. Sutton, Cambridgeport, Mass.
I claim as my invention, the clamp, C, as combined with the cammed lever, E, and the adjustable shoulder, B, and formed to straddle or embrace opposite sides of the ledge of the composing stick.
Also, the combination and arrangement of the screw, d, with the clamp, C, the cammed lever, E, and the adjustable shoulder, B, arranged and applied together, substantially in manner and so as to operate as specified.

78,034.—WHIFFLETREE.—Harvey Webster, Cambridge, Vt.
I claim the plate, A, with its grooves, B and C, the spring lever, E, cast-off, D, the spring, F, and draft pin, G, all arranged and operated as shown and described.

78,035.—THILL COUPLING.—Harvey Webster, Cambridge, Vt.
I claim the wedge plate, A, bolt holder or cap, B, and the spring, C, as applied to thill couplings, and operated either by draft or pressure, all for the purpose herein specified.

78,036.—HAT.—William H. White, New York city.
I claim, 1st, A hat or cap in which the crown is detachable or removable from the brim, substantially as and for the purposes herein shown and specified.
2d, A hat composed of a brim, brim, former or frame, and crown, arranged substantially as herein described, so that each of said parts may be readily detached from or combined with the others, as set forth.
3d, In a hat or head covering in which a brim of suitable material is combined with a brim frame or former, as herein described, the combination, with the brim and draw casing formed in the outer edge of the fabric of which the same is made, of draw strings or a draw string passing twice around the brim, under the arrangement and for operation as shown and set forth.
4th, The combination of a detachable or adjustable and removable crown with a cap vizor and head band, when the two latter are permanently fastened together, or formed in one piece, substantially as and for the purposes herein shown and specified.

78,037.—HOP POLE.—David F. Wilcox, Greenville, N. Y.
I claim the arrangement of the curved bars, B B, passing through the pole, A, arms, C C C C, and cords, D and e, all constructed and used substantially in the manner specified.

78,038.—DOOR LOCK.—Lucius L. Woolley, Medford, Mass.
I claim the combination and arrangement of the tooth notch, a, and the arcal stop notches, b c, of the bolt, C, with the segmental tumoler, D, provided with the tooth, d, and the two notches, e e, arranged as specified.

78,039.—CORN PLANTER.—J. M. Allison, Cranberry, Pa.
I claim, 1st, The combination of the gear wheels, O and N, shaft, J, cams or arms, I, slotted slides, G, and springs, D, with the drive wheel, C, frame, A, and hoppers, E, substantially as herein shown and described and for the purpose set forth.
2d, The combination of the adjustable slide bottom, F, with the hoppers, E, and slotted slide, G, substantially as herein shown and described and for the purpose set forth.

78,040.—VENETIAN BLIND.—Hans Heinrich Andresen and Hans Asbahr, Davenport, Iowa.
We claim, 1st, Hinging the slats, a, by their edges to the suspension chains, C C, in combination with a lifting chain or chains and pull cords, arranged substantially as described.
2d, In combination with slats which are hinged and hung, substantially as described, attaching the free edges of the slats together by means of separate lifting chains, D D', substantially as and for the purposes described.
3d, A Venetian blind, which is constructed and operates substantially as described.

78,041.—MANUFACTURE OF STEEL.—Fritz Asthower, Witten an der Ruhr, Prussia, assignor to Joseph R. Von Wessely, New York city.
I claim, 1st, The combination of the fire chamber, A, and crucible chambers, C E, as and for the purposes set forth.
2d, The construction of the dome of the furnace with vertical plugged openings, as described, to afford a view of the interior.
3d, The crucibles, having plugged covers arranged beneath the openings in the dome, as and for the purpose described.

78,042.—CHURN.—David Bartholomew and David C. Dinsmore, Kirkville, Iowa.
We claim the combination of the churn and the frame, A, constructed with a removable brace, A', and the arm, D, for giving a reciprocating revolution to the dasher, and so adjustably connected with the pitman, E, and driving mechanism that the churn may be removed from the frame, substantially as set forth.

78,043.—DEVICE FOR PROPELLING PLEASURE BOATS.—J. O. Belknap, Mobile, Ala.
I claim the employment of a revolving frame, working on a vertical stand ard, and having arms or sweeps, to which pleasure boats may be attached for the purpose of propelling such boats on the water, substantially in the manner above set forth.

78,044.—CHICKEN COOP.—S. S. Bent, Portchester, N. Y.
I claim a chicken coop, formed with an openwork metallic plate, in the lower portion of which there are openings, closed, when desired, by a range of doors or covers, substantially as and for the purposes set forth.

78,045.—PISTON ROD ADJUSTER.—Douglas Bly, Macon, Ga.
I claim the clamp, A, combining both a free vertical adjustment of the rod and a joint for connecting with the walking beam for insuring a free play, substantially as herein set forth.

78,046.—PAVEMENT.—W. W. Boyington, Chicago, Ill.
I claim a foundation for a wood and concrete pavement, formed with a layer of boards, A, lengthwise with the street, and a layer of plates, B, transverse, and nailed fast thereto, said plates being of equal widths, and with spaces between equal to the thickness of the blocks composing the wooden portion of said pavement, substantially as described.
The combination of the foundation, A B, constructed as described, with the blocks, C and C', and concrete filling, in the manner and for the purpose herein set forth.

78,047.—PIPE WRENCH AND CUTTER.—James L. Brierly, Auburn, Mass.
I claim, 1st, The slotted hook, C, when pivoted to the lug, a, formed upon the side of the nut, B, and held against the pipe by means of the spring, E, pressing against its back, and secured at one end to the end of the lug, a, all constructed, arranged, and operating as described for the purpose specified.
2d, The cutter block, F, when provided with the lateral pin, c, fitting through the slot in the spring hook, C, whereby the cutter is guided and prevented from turning upon the rod, A, as herein described for the purpose specified.

78,048.—ARTIFICIAL LIMB.—B. Briody, Detroit, Mich.
I claim, 1st, The combination of the parts, A and B, by means of a hinge joint, constructed substantially as and for the purpose described.

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2d, The combination of the parts, A and C, by a hinge joint, substantially as and for the purpose described.
3d, The combination, with the hinge joint, d d, constructed substantially as described, of the rubber or other yielding washer springs, f f', as and for the purpose described.
4th, The combination, with the parts, A and B, and the hinge joint as described, of the india-rubber, or other yielding springs, D D, substantially as and for the purpose described.
5th, The combination, with the parts, A and C, and their hinge joints, d2 d2, of the rubber or other yielding springs, F, substantially as and for the purpose described.
6th, The combination, with the parts, A and B, jointed together as described, of the semicircular spring, h, substantially as and for the purpose set forth.

78,049.—DRAFT ATTACHMENT FOR VEHICLES.—W. P. Brooks, Bloomington, Ill.

I claim a draft attachment, or evener, composed of a bar, A, provided with bars, C, having hooks, d' d'', either or both, at its ends, in connection with the central bar, B, with adjustable eye or loop, d, attached, all constructed and arranged substantially in the manner as and for the purpose set forth.

78,050.—VEGETABLE MASHER.—Edmund Brown (assignor to himself and G. D. Wright), Burlington, Vt.

I claim, 1st, A vegetable masher consisting of a perforated stationary frame and of a smooth swinging and sliding presser, as set forth.
2d, The perforated frame of a vegetable masher, when composed of the stiff bars, a a, and of the wire rods, b b, arranged in front of and crossing the bars, a, substantially as herein shown and described.
3d, The sliding and turning presser, E, provided with hooks, e, in combination with the pins, h, on the posts, B, and with the perforated fabric, a b, or its equivalent, all operating as set forth.
4th, The device set forth in the foregoing clause, in combination with the sliding follower, F, operating as specified.
5th, The notched fixed scraper, J, in combination with the frame, D, and with the presser, E, all operating substantially as herein shown and described.
6th, The combination of the frame, A B, and frames, C D, with the smooth swinging and sliding presser, E, with the hooks, e, and pins, h, with the follower, F, and scraper, J, all made and operating substantially as herein shown and described.

78,051.—MODE OF CONSTRUCTION OF PEAT CARS.—Jonathan Bundy, West Liberty, Iowa.

I claim the car, A, provided with hinged bottom, E E, when combined with the shaft, G, cords or chains, s s, bar, m, and lever, H, all arranged as and for the purpose set forth.

78,052.—CORN HUSKER.—I. S. Bunnell, Carbondale, Pa., assignor to himself, Otis Reynolds, and Geo. W. Reynolds.

I claim the combination of the cast iron gate, O, steel knife, A, lever C, spring, S, trough, D, with bench, B, as herein described, and for the purpose set forth.

78,053.—GAS HEATER.—Charles Burnham, Philadelphia, Pa.

I claim the two cylinders arranged to slide telescopically, one within the other, to adjust the hight of the plane of combustion or the length and capacity of the mixing-chamber, substantially as described.

78,054.—ROAD SCRAPER.—E. P. H. Capron, Springfield, Ohio.

I claim the combination of the scraper, A, provided with the plate, O, having the stop, e, and notch, n, with the frame, B, provided with the lever, C, and pawl, h, all constructed and arranged to operate as shown and described.

78,055.—BOLT CUTTER.—Alexander Carbnow, Potsdam, N.Y.

I claim the devices as arranged and shown in combination, as and for the purposes set forth.

78,056.—FASTENING FOR CORSETS.—Wm. B. Cargill, New Haven, Conn.

I claim, 1st, The combination of the busk, B, with the recessed clips, a, of the busk, A, substantially as described.
2d, The recessed clip or female fastening device formed with projecting lip or lips, substantially as described and for the purpose set forth.

78,057.—SHUTTLE FOR SEWING MACHINES.—D. M. Church (assignor to himself, W. T. Beard, and T. E. Beard), Birmingham, Conn.

I claim a bobbin for sewing-machine shuttles, provided with detachable ends or caps, C C, having center points, b, substantially in the manner as and for the purpose set forth.

78,058.—LANTERN.—P. J. Clark, West Meriden, Conn.

I claim, 1st, The ring, E, formed as shown, with the lower ends of the guards D, passing through it, and two or more of said guards provided with shoulders, d, in combination with the flange, b, on the upper edge of the base, C, with notches, c c, made in it, all arranged substantially as and for the purpose set forth.
2d, The spring catch, F, attached to the under side of the flange, b, when said spring catch is used in connection with the ring, E, and guards, D, and all constructed and arranged as set forth.

78,059.—WRAPPER FOR NEEDLES.—John Clark, Redditch, England.

I claim the sheath, a, applied to the wrapper, b, to operate in the manner and for the purpose substantially as set forth.

78,060.—TENONING MACHINE.—William F. Cobb, Whitestown, Ind.

I claim, 1st, The adjustable chisel bar guides, 4, rack bars, 3, crank, 5, and pinions, 6, in combination with central block, D, and its plates, 1 1, arranged and operating conjointly as and for the purpose described.
2d, The construction of the chisel, consisting of the blade, Q4, attached to the blade, Q3, by the hinge-joint, r, and adjustable by means of screw, t, and link, f, working in the arm, e, whereby the chisel may cut a tenon at a right angle or less, all constructed and arranged to operate, substantially as described.

78,061.—MODE OF TREATING MINERAL PHOSPHATES FOR THE MANUFACTURE OF FERTILIZERS.—John Commins, Charleston, S. C.

I claim, 1st, Treating mineral or earthy or natural phosphates, while in a heated state, with gas liquor and sulphuric acid, when such phosphates have previously been treated with a solution of chloride of sodium.
2d, Treating such phosphates, when in a heated state, with gas liquor, when such liquor is combined with sulphuric acid, or any other acid or salt, whether such phosphates have been previously treated with a solution of chloride of sodium or not, substantially as and for the purpose described.

78,062.—BEEHIVE.—Peter Compton, Sullivansville, N. Y.

I claim, 1st, The herein-described improved beehive, when constructed and arranged substantially as and for the purpose described.
2d, In combination with the boxes, D D, provided with the detachable portions, h h, and metal strips, i i, the metallic perforated covers, k, substantially as and for the purpose described.

78,063.—SADIRON HOLDER.—D. T. Conde, Beloit, Wis.

I claim a sadiron holder, having lid, A, adjustable irons, B, pin, C, bottom, D, springs, E, and shield, G, adjusted, combined, and arranged substantially as specified.

78,064.—WHIFFLETREE EVENER.—Freman N. Corbin, Champlain, N. Y.

I claim the combination of the doubletree, B, clevises, F F, bars, E E, all arranged and applied to the draft pole, A, to operate in the manner substantially as and for the purpose set forth.

78,065.—CARPENTERS' GAGE.—F. W. Coy, Boston, Mass.

I claim a carpenters' gage, the guide, L, of which is capable of angular adjustment, in the manner and operating substantially as described and for the purpose set forth.

78,066.—COMBINED SEEDER AND CULTIVATOR.—E. F. Crawford, Canaan, Ind.

I claim the construction and arrangement of the framework and operative gear of the machine, in such a manner that the different machines can be used together, or successively, substantially as and for the purposes specified.

78,067.—WASHING MACHINE.—J. C. Crawford, St. Charles, Ill.

I claim the combined washing machine and clothes presser, constructed as described, and consisting of the box, A, having corrugated bottom, B, and partition, c, the frame, a, provided with plain rollers, C, connecting rod, b, and lever, D, perforated bottom, G, follower, F, and lever, E, all arranged and operating as and for the purpose set forth.

78,068.—LINIMENT.—A. J. Creel, Hopkinton, Iowa.

I claim a liniment, formed of the ingredients and in the proportions substantially as herein described and for the purposes set forth.

78,069.—CLOTHES DRIER.—J. D. Davenport, North Providence, R. I., assignor by J. D. Thurston, his trustee, to himself, H. M. Curtis, and Henry Martin.

I claim the application of a clamp, E D, to the slats, B, of a clothes horse, radiating from a common spindle, substantially as described for the purposes specified.

78,070.—METHOD OF INSERTING ARTIFICIAL TEETH.—V. R. David, Sandwich, assignor to himself and D. R. Pomeroy, Plano, Ill.

I claim the wings, C C, constructed substantially as and for the purposes specified.

78,071.—MOP WRINGER.—A. J. Davis, Hartford, Mich.

I claim, 1st, The sliding frame, D, the shaft and gear wheels, E F and H, arranged substantially as shown and described, in combination therewith, and with the mop, B, and frame, A, for the purposes set forth.
2d, in combination with the above, the holder, G, constructed, arranged, and operating as described for the purpose set forth.

78,072.—MILK CAN.—J. E. Dean, Canaan, Conn.

I claim the adjustable metallic case, A, lined with felt or other non-conducting substance adhered to it, or without the lining, and the adjusting of it with the movable clasp, C D D, substantially as and for the purpose set forth.

78,073.—BRIDGE. — Edward Denmead, Marietta, Ga., and Wendel Bollman, Baltimore, Md.

We claim, 1st, Supporting the angle irons, E, upon a bolt instead of upon the chords, substantially as and for the purpose described.
2d, In combination with angle irons supported upon a bolt instead of upon the chords, the interposing, between said irons and chords, of an elastic cushion, substantially as and for the purpose described.

78,074.—RAILWAY-CAR STOVE.—Isaac Dripps, Fort Wayne, Indiana.

I claim, 1st, The grating, O, placed in the bottom of the draft opening, M, and over the ash box, substantially as and for the purpose set forth.
2d, The arrangement of the perforations, P, and door, N, substantially as and for the purpose set forth.
3d, A stove constructed with the grating, O, perforations, P, and perforated diaphragm, arranged substantially as and for the purpose set forth.

78,075.—HORSE COLLAR AND HAME.—Alexander Dunbar, New York city.

I claim, 1st, The draft hook, e, attached to the staple, d, and passing through the collar, A, and a slotted plate, f, attached to the hames, said plate, f, having its part, G, bent into the collar, all constructed and arranged to operate as herein described for the purpose specified.
2d, In combination with the hames, B, and collar, A, the adjustable link, b, as herein described for the purpose specified.

78,076.—RELAY MAGNET.—Charles Durant (assignor to G. F. Durant), Jersey City, N. J.

I claim, 1st, The jointed armature, or armature lever, A or G, in combination with the magnet cores, E or E', or Ex Exx, or either of them, substantially as herein shown and described.
2d, The flexible joint, in extended armature or armature lever, substantially as and for the purpose herein fully set forth and described.
3d, The shifting or sliding bolt in the extended armature or armature lever, substantially as and for the purpose herein fully set forth and described.

78,077.—MACHINE FOR SETTING BUTTON HOOKS.—Phillip Esser and F. A. Steere, North Providence, R. I.

We claim, 1st. A machine for setting buttonholes, consisting of a revolving block, B, with acting faces, as described, in combination with the spring-pawl, d, and jaws, A A, operating substantially as set forth.
2d. Constructing the jaw, A, with a receptacle, E, for the button hook, so as to hold and sustain the same while it is being inserted and its prongs clinched, substantially as shown and is worked.

78,078.—MANUFACTURE OF IODINE.—Jules Fougerat, New York city.

I claim, 1st, Producing iodine from mussels, as set forth.
2d, The process, herein shown and described, of producing iodine from mussels.

78,079.—MACHINE FOR ENAMELING PAPER.—M. H. Gardner, New York city.

I claim, 1st, The arrangement, within the mixing vessel or chamber, A, of the revolving brush, B, and stationary brushes, C C, for operation together, substantially as described.
2d, The combination, with the revolving brush, B, and stationary brushes, C C, of the mixing vessel or chamber, A, screen, D, and slide or gate, E, essentially as specified.
3d, The traveling endless belt or apron, J, constructed with thickened sides or edges, n, and divided into sections by openings, l, having fingers or gripers, i, at or near their edges, as herein set forth.
4th, The drums, L, grooved at or near their one end, and provided with detachable rings, M, in combination with the endless belt, J, formed with thickened sides, n, for operation together, as described.
5th, The combination of the trunk, G, cylinder, H, provided with openings, c and d, revolving brush, I, and valves or faucets, b.
6th, The rotary brush, I, constructed substantially as described, with its rows of bristles, or certain of them, attached to or carried by sliding bars of less length than the brush stock, and adjustable along the same, to vary the width or length of the operating surface of the brush, to adapt it to different widths of paper, as herein set forth.
7th, The angularly-arranged brush or brushes, N, adjustable as described, for operation on or over the surface of the paper or other material, essentially as and for the purposes herein set forth.
8th, In combination with the distributing or leveling brushes, N, the blending brush or brushes, P, for action together, as specified.

78,080.—CULTIVATOR.—Henry A. Gaston, Stockton, Cal.

I claim, in combination with an inclined reversible bit for a cultivator, the method of securing such bit to its standard, substantially as set forth.
Also, the combination of the series of bits (so applied to their vertical standards) with the cultivator frame or carriage, substantially as described.

78,081.—CHURN.—George W. Goodwyn, Petersburg, Va.

I claim the combination of a rocking wheel or lever, I, with the straps, G J, treadle, F, dasher, D, and spring, E, the whole constructed and operating in the manner and for the purpose described.

78,082.—HARNESS FOR VICIOUS HORSES.—S. L. Gray, Chillicothe, Ohio.

I claim the strap, D, and rings, c, in combination with the strap, C, pulley, b, and straps, F F, as herein described for the purpose specified.

78,083.—CORNICE FOR BUILDING.—C. C. Hare, Louisville, Ky.

I claim a cast-iron or other metal bracket or look-out for receiving a sheet metal cornice, substantially as described.

78,084.—LAMP SHADE.—E. K. Haynes, Hanover, N. H.

I claim a lamp shade, made of a screen, supported upon two uprights, bent and joined at their lower ends, to connect them, and to support the screen at proper distance from the chimney, and bent and made hook formed, at their upper ends, to suspend the screen from the top of the chimney, the screen sliding upon the frame, and being supported relatively thereto, substantially as described.

78,085.—SPINNING FRAME.—Frederick Haythorn, Philadelphia, Pa.

I claim the guards, E, in combination with the fingers, D, and shaft, C, substantially as described for the purpose specified,

78,086.—HORSE HAY RAKE.—W. A. Heath, Apalachin, N. Y.

I claim, 1st, The combination of the hand lever, T, shaft, S, standard, R, and lever, Q, with each other and with the frame, E, standard, M, and lever stops, O, substantially as herein shown and described and for the purpose set forth.
2d, Pivoting the draft bars, D, of the rake, to the frame, E, at points a short distance from the ends of said draft bars, so that they may serve as levers in raising the rake head from the ground, substantially as herein shown and described.
3d, The combination of the hand lever, K, shaft, I, and arms, J, with the frame, E, and forward ends of the pivoted draft bars, D, substantially as herein shown and described and for the purpose set forth.

78,087.—WATER SPOUT FASTENING.—G. A. Hein, Waterford, Pa.

I claim the conductor fastening, C, composed of two or more circular parts jointed together, and fastened to each other and to the building, substantially as herein shown and described.

78,088.—COTTON CULTIVATOR.—L. Henderson, Manson, N.C.

Antedated May 12, 1868.
I claim the adjustable hinged plows, E E, in combination with the gear wheels, D and E, shaft, F, and hoes, G and H, constructed substantially as described and operating as and for the purpose set forth.

78,089.—CONCENTRATOR.—Joshua Hendy, San Francisco, Cal.

I claim, 1st, The annular groove, I, declining from a certain point to an opposite or discharging point, in combination with a vibrating or oscillating pan or concentrator, whose surface is convex or curvilinear, as described.
2d, The discharge valve or gate, M, when constructed and arranged to operate substantially as described.
3d, The T-shaped distributer, K K, pierced with holes, b b b, and having slots, b' b', said distributers being either stationary or movable, and when movable the notched edge, c c c, with pawls or their equivalents, d d, operating therein for driving the said distributers, substantially as and for the purpose described.
4th, The agitators or stirrers, a a a, attached to stationary or movable radial arms, x x, or their equivalents, with an oscillating pan, as described.
5th, The peculiar construction of the frame, A A, it being triangular in form, the projecting ends, B B, for the crank shaft, the point, A', in combination with an oscillating pan, substantially as described.
6th, The overreaching supports or braces, F F, connecting at the point, F', and in which the upper end of the vertical shaft turns, in combination with the frame, A A, with the projecting ends, B B, and oscillating pan, substantially as described.
7th, The peculiar construction of the ball crank pin, N', when employed in an oscillating pan, substantially as described.
8th, The oil groove, H, either in the hub of the pan or on the shaft, G, and the oil cavity, J', above the hopper, for lubricating the sleeve and step, with an oscillating pan, substantially as described.

78,090.—PROCESS OF FACING WOOL HAT BODIES WITH FUR.

Ralph D. Hine, Mattewan, N. Y.
In the manufacture of soft hats, applying a bat of fur to a bat of wool, taken directly from the carding machine, before either has been shrunk, basined, blacked, or felted, and after causing them to adhere together by slight pressure, shrinking and felting them down to the required dimensions to form a solid, even fur surface upon the outer side and under brim, substantially as herein described.

78,091.—CHURN.—Austin D. Hoffman, Mineapolis, Minn., assignor to himself, H. M. F. Carpenter, G. F. Townsend, and Frederick Brackett.

I claim the combination of the winch and crank, the pitman, E, segment, E', and pinion, G, for communicating both a vertical and rotary reciprocating action to the dasher, substantially as set forth.

78,092.—GAGE FRAME FOR SLITTING RAW HIDES.—James Hoffman, Belvidere, N. J.

I claim, 1st, Grooving the upper edge of the frame or plank, A, upon which the raw hide is suspended longitudinally, substantially as herein shown and described, and for the purpose set forth.
2d, The combination of the slotted spring, C, with the grooved frame or plank, A, substantially as herein shown and described and for the purpose set forth.
3d, Slitting raw hides by suspending them over a frame, A, grooved longitudinally along its upper edge to guide the slitting knife, substantially as herein shown and described and for the purpose set forth.

78,093.—MACHINE FOR POLISHING WOOD.—Henry O. Hooper, Diamond Springs, Cal.

I claim the circular rotary polishing plates, E, and the reciprocating polishing plates, H, arranged with and attached to the adjustable framing, B', all constructed to operate as described for the purpose specified.

78,094.—PLATE FOR ARTIFICIAL TEETH.—Isaac A. Horn, Cincinnati, Ohio.

I claim the suction or vacuum chambers, operating against the cheek and alveolus and the sharp ridge on the outer rim of the plate, these to be made of any material used in dentistry, substantially as and for the purposes above set forth.

78,095.—FARM GATE.—Van Rensselaer W. Horton, Palmyra, N. Y.

I claim the combination with a sliding and swinging gate of a movable support, provided with a roller or rollers, and loosely attached to the bottom rail of the gate by a loop or its equivalent, the whole so combined and operating, substantially as herein shown and described, that the gate when closed rests centrally upon the support, and has a free sliding movement through or upon it in being opened and shut, and lifts it and carries it out of the passage when swung to one side.
Also, the movable support, K, consisting of the body represented by fig. 3, the rollers, b b, and the loop, e, shown in combination with body at fig. 2, the whole combined and operating substantially as herein shown and described.

78,096.—MEDICAL COMPOUND.—J. P. Humes, Winnebago City, Minn.

I claim the medicinal composition composed of the ingredients and in the manner substantially as herein described.

77,097.—PERMUTATION LOCK.—Gottlob Kaiser, New York city.

I claim the thumb pieces, c, in combination with the rings, C, bolt, B, stumps, a, and case, A, arranged, constructed, and operating substantially as and for the purpose set forth.

78,098.—SCALE BEAM.—Joel F. Keeler, Pittsburg, Pa.

I claim a poly-poised scale beam, provided with adjustable or variable weights or stops, and constructed and operating substantially in the manner and for the purposes as described.

78,099.—MACHINE FOR TAKING THE TOLL FROM GRAIN IN GRIST MILLS.—C. F. Keller, Nevada, Ohio.

I claim a machine for tolling grain as it passes through it, and composed of a series of divided passages, and guiding and directing partitions, as and for the purpose described and represented.

78,100.—SHIELD PLOW.—Michael Kirkham, Eminence Post Office, Ind.

I claim the above described shield, when made of rigid vertical bars, having both their lower and upper ends united by rigid horizontal bars, substantially as set forth.

78,101.—SAFE-DOOR LOCK.—John G. Kriechbaum, Youngstown, Ohio.

I claim, 1st, The screw, a, when operating as herein shown and described, in combination with the bar, I, all made and operating substantially as herein shown and described.
2d, The bar, I, bar, I, and plate, K, when arranged as described, in combination with the spring, l, shank, k, and plate, J (or stem, k, of key, and head, J, of the same), all made and operating substantially as herein shown and described.
3d, The bolts, M and N, when the same are arranged in one lock, that when one bolt is moved out the other is drawn in, and *vice versa*, as set forth.
4th, The rack, o, when hinged to the bolt, M, so that it can be turned up and thrown out of gear, as and for the purpose set forth.
5th, The pin, t, on the plate, o, in combination with the slotted partitions, 2 and 3, and hinged spring plates, P and R, all made and operating substantially as herein shown and described.
6th, The plate, P, when provided with a slot, w, and when combined with the pin, t, and bar, I, all made and operating substantially as herein shown and described.
7th, The plate, P, when arranged in combination with the catch, S, so that a full turn of the key will not keep it up, as set forth.
8th, The plate, R, when provided with a slot or recess, y, and when combined with the pin, t, and bar, I, all made and operating substantially as herein shown and described.
9th, The bar, I, when provided with recesses, g, h and x, in combination with the plates, K, f, R and P, all made and operating substantially as herein shown and described.

78,102.—MACHINE FOR WASHING BRISTLES, ETC.—Louis F. Lannay, Indianapolis, Ind.

I claim, 1st, The combination of the vertical grooved frame, B, crank shaft E, and pitman, F, with the sliding frames, G and D, for the purpose of holding and operating the said frames, substantially as shown and described and for the purpose set forth.
2d, The adjustable convex corrugated rubbing blocks, K, in combination with the frames, G and D, and cam, H, substantially as herein shown and described and for the purpose set forth.

78,103.—DEVICE FOR PULLING HOP POLES.—Isaac W. Legg, Long Eddy, N. Y.

I claim the levers, A, when hinged to the upper edge of the wedge-shaped block, C, by means of the pin, B, and cross bar, e, said levers also provided with the plate, f, upon their under sides, as herein shown and described, for the purpose specified.

78,104.—TIN WARE.—Leopold Lehmann, Monee, Ill.

I claim the application of round tinned wire to the bottoms of tin ware, in the manner and for the purposes substantially as herein specified.

78,105.—MACHINE FOR FORMING SHEET METAL WARE.—N. C. Lombard and Mellen Bray, Boston, Mass., assignors to Mellen Bray.

We claim, 1st, Imparting the motion of the vibrating shaft, V, to the side toggles that operate and control the motion of the cutting and holding dies, by means of the vibrating cranks, W W, and the oscillating slotted levers, X X, substantially as described.
2d, So constructing the oscillating levers, X X, that a portion of the slot or path may be adjusted, substantially as described.
3d, The combination of the vibrating cranks, W W, with the central crank, B', by means of adjustable dogs or stops, Y Y, substantially as described.
4th, The yielding stop bars for arresting the downward motion of the shell and plunger, substantially as described.
5th, The spring fingers, d', or their equivalents, for removing the dish from the male forming die, substantially as described.
6th, We do not claim, broadly, wedges placed under toggles for adjusting the same, for we are aware that such have been used before; but what we claim is the use of wedges under toggles for adjusting the pressure of the same when they are so attached to the toggles, and to the base in which they slide that they may be freely moved out or in, while at the same time they hold the toggles firmly in their proper relation to the base, and prevent them from being disconnected from the same.
7th, Fitting the plunger, G, to the shell, E, in such a manner that the plunger shall rest upon the shell, and be moved with it when the shell is moved up by the action of the side toggles, substantially as described.

78,106.—DOUGH KNEADER.—S. H. Lombard, Winona, Minn.

I claim the sectional hinged board, A, having the detachable frame, B, and roller, C, arranged for use therewith, substantially as shown and described.

78,107.—ORGAN PIPE.—Joseph Lorenz, Cincinnati, Ohio.

I claim the *vox humana* organ pipe, A B C c D, formed as and for the purpose set forth.

78,108.—MANUFACTURE OF WATERPROOF FABRICS.—R. O Lowrey, Salem, N. Y.

I claim, 1st, The new waterproof fabric produced by the combination and treatment of paper, cloth, and leather, or similar articles, substantially as herein described.
2d, The process as herein described of combining and treating paper, cloth, and leather, or similar articles, for producing a new waterproof fabric, substantially as described for the purposes set forth.

78,109.—CHICKEN COOP.—J. H. Malbett, Jersey City, N. J.

I claim, 1st, The coop, having its sides hinged, hooked, or otherwise connected, in such manner that they may be folded together when the ends of the coop are removed, substantially as herein set forth.
2d, The combination of the detachable slatted end frame with the sides of the coop, substantially as and for the purpose herein set forth.
3d, The shelf or ledge, provided within the coop, substantially as and for the purpose specified.

78,110.—FRUIT BASKET.—Osborne McDaniel, New York city.

I claim, 1st, The improved fruit basket or box, made of one piece of veneer, having the flaps cut out at the corners, substantially as described, and bent in a curve with the grain of the wood, so as to prevent splitting in bending, and to provide for shrinkage, as herein set forth.
2d, In a fruit box made of a single piece of veneer, as described, bending two sides with the grain of the wood, when green or wet, in such manner that there shall be an excess of wood in the curve to provide for the shrinkage of the wood in drying or seasoning.

78,111.—GANG PLOW.—G. W. Manuel, San Francisco, Cal.

I claim, 1st, The arrangement of the crank arms, d e f, under the hounds or bars, and in their relation thereto, as and for the purposes set forth.
2d, In a gang plow, having a series of plows arranged on bars or hounds parallel to each other, placing the one plow on the bar, g, outside of the wheel, a, and in front of the axle, as and for the purposes recited.
3d, The combination of the extended crank arms, d and e, with the lever, I, and curved bar, o, as and for the purposes herein set forth.
4th, The crank screw, r, and plates, s and t, for elevating and depressing the tongue, as described.

78,112.—PRESERVING POWDER.—George A. Mariner (assignor to himself and John B. Turchin), Chicago, Ill.

I claim the powders composed of sulphites, bisulphites or hyposulphites, or any compound evolving the sulphurous acid gas, when acted upon by acid or acid substances, in combination with vegetable or mineral acids, or with vegetable or mineral acid salts, or desiccated vegetable juices, with or without the absorbents herein specified, for the purpose of generating the sulphurous acid gas, and applying the same to various uses, substantially as and in the manner herein set forth and specified.

78,113.—FURNACE FOR ROASTING IRON ORE.—Charles Mellinger, Cornwall, Pa.

I claim, 1st, In combination with a desulphurizing furnace or oven for preparing iron ore for smelting, the sliding door or damper, B, arranged and operated substantially as described.
2d, In combination with a desulphurizing furnace for the purposes mentioned, the grated or perforated arch, F, substantially as described.
3d, The combination of the arch, F, the chambers, E and H, the apertures, J and L, and the damper, B, substantially as and for the purposes described.

78,114.—HORSE HAY FORK.—John Milholland, New Concord, Ohio.

I claim the construction and arrangement of the handle, C, connected with the sliding bar, B, by the arm, E, turning on the pivots, e e', the lower ends of said handle pivoted to the stud, c, upon the bar, A, the bent trigger, F f, pivoted upon the pin, e, of the bars, E, and handle, C, all operating as described, for the purpose specified.

78,115.—SASH AND SHUTTER FASTENING.—Wm. J. Miller, Washington City, D. C.

I claim the combination of the shutter catch, b, lock, C, rod, h, hook, k, and plates, l and j, or the equivalents of said plates, constructed, arranged, and operated in the manner substantially as shown and described and for the purpose of locking or unlocking shutters and sash from within the room.

78,116.—BUTTON.—Marquis D. Moore, Brooklyn, N. Y.

I claim, 1st, The fastener formed in two sections, A B, fitted to each other, substantially as shown and described, for the purpose set forth.
2d, The lateral spurs, a*, of the piece, B, arranged to act in connection with the notches, b', at the sides of the recess in the piece, A, substantially as and for the purpose specified.

78,117.—MACHINE FOR CASING TOBACCO.—Enoch R. Morrison, Pittsburg, Pa.

I claim the method of casing tobacco by means of a hollow revolving vessel, receiver, or its equivalent, working on a shaft journals, or rollers, the receiver being made of any required shape or dimensions, for the purposes set forth.

78,118.—DOUBLER FOR STILL.—E. A. Muller and Theodor Stock, Chicgo, Ill.

We claim, 1st, Arranging around the outside of a rectifier or doubler, A, a series of annular cooling vessels, D D, which communicate with the upper part of the vessel, A, substantially as and for the purpose herein shown and described.
2d, The arrangement and combination within the cylinder, A, of the dishes, E, plates, F, and combined dishes and plates, G, all made and operating substantially as herein shown and described.

78,119.—MANUFACTURE OF CART SADDLE.—Barak T. Nichols, Newark, N. J.

I claim the bridge, a, bridge pieces, c c, pads, f, tugs, i, and tug straps, j, all combined, constructed, arranged and connected substantially in the manner and for the purposes specified.

78,120.—CAR SPRING.—Wm. R. Nichols, Philadelphia, Pa.

I claim one or more springs, each of which is composed of one or more layers, in the manner described, in combination with saddles constructed and adapted to the said spring or springs, substantially as specified.

78,121.—MOP AND SCRUBBING-BRUSH HOLDER.—P. O'Brian, Philadelphia, Pa.

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I claim, 1st, Cross bar, B, cast on shank, A, with opening. c c, and projections, d d, for the use and purpose as specified and herein set forth.

2d, The swinging clamp, E, made of wire or other material in the shape shown, and for the use and purpose as specified and herein set forth.

3d. A "mop and brush holder," constructed of shank, A, cross bar, B, nut, N, swinging clamp, E, and hook, F, as connected, combined and adjusted for the use and purpose specified and herein set forth.

78,122.—FIREMAN'S ELEVATOR.—Volney O'Bryan, St. Johns, Mich., assignor to De Witt C. O'Bryan and Amelia O'Bryan.

I claim the arrangement in a machine for the purpose set forth, of the wagon, B, stationary frame, C, movable frames, ropes and sheaves, and lateral supports, G H, and screws, L, substantially as described.

78,123.—CRIB AND BEDSTEAD.—George T. Palmer, Brooklyn, N. Y. Antedated May 5, 1868.

I claim a bedstead provided with a clamp, composed of the part, B, having spring bolts, a, and racks, b, or their equivalents, substantially as and for the purpose shown and set forth.

78,124.—HARNESS BUCKLE.—C. B. Payne, Bloomington, Ill.

I claim a double buckle, constructed with a central plate, A, wings, B B, and loop, D, cast in one piece, and with both ends alike, substantially as and for the purpose described.

78,125.—MATERIAL FOR INSULATING TELEGRAPH CONDUCTOR.—Wm. Perkins, Russell Place, Fitzroy Square, and George Grainger Tandy, Anerly Road, Hamlet of Penge, England.

We claim as our invention the combination or anthracene or para-naphthaline and naphthaline, with india rubber, gutta percha, gum-ballata, and other analogous vulcanizable substances, and sulphur, for the purpose of producing a preparation or compound applicable to the uses or purposes above mentioned, or any analogous purposes.

78,126.—RAILWAY SWITCH PLATE.—Adolph Philippi, Elizabethport, N. J

I claim a switch plate, consisting of the bed plate, A, elastic bed, B, and plate, C, and of the removable blocks, D and E, all made and operating substantially as herein shown and described.

78,127.—MACHINE FOR CUTTING AND STAMPING SOAP.—J. S. Pierson, Brooklyn, N. Y.

I claim, 1st. The combination of stationary knives, F, sliding slab table, G, stamps, I, and cross knives, P, for operation together, substantially as specified.

2d, The cross knives, frame, and stamp frame, arranged independently of each other, in combination with devices for separately operating the same by foot and hand, as herein set forth, and whereby the slab may be held by the stamps while the cross knives are entering and receding, essentially as described.

3d, The combination of the knives, F, made of a sloping character, as shown and described, and sliding slab table, G, for action in concert as specified.

78,128.—MOLE TRAP.—Clark Polley, Sinking Spring, Ohio.

I claim the combination of one or more pointed stakes, A, with a cross piece, B, the tubes, e and d, the spring, g, trigger staff, n, level, l, crutch head, b, having points, f f, all constructed and operating together substantially as shown and described, and for the purpose set forth.

78,129.—PROCESS OF COVERING WHIPS.—A. C. Rand, Westfield, Mass.

I claim the process of covering whips, substantially as herein specified.

78,130.—GAGE FOR EMBOSSING-PRESSES.—Warren Richards, Jr. (assignor to himself and Shipley & Smith), Cincinnati, Ohio.

I claim, 1st, The arrangement, substantially as described, of the slotted plate, C, stops, H, and springs, I, or their equivalents, as and for the purpose specified.

2d, The combination of the longitudinal slot, F, and branch slot, G, for the object explained.

78,131.—BOOT CRIMPER.—Peter Richmond, Aberdeen, and Abner McFarland, Allensville, Ind.

We claim, 1st, The lever, E, in combination with the hook, j, when constructed, used, and operated substantially as and for the purpose set forth.

2d, The arrangement of the jaws, B B, bolt, g, eccentrics, C and D, lever, E, and forked rod, j, the several parts being constructed and operated substantially as and for the purpose specified.

78,132.—PLANER CHUCK.—Charles H. Riggs, Windsor Locks, Conn.

I claim, 1st, In a milling or planing chuck, the combination of the bed plate a, and angle iron, b, chuck g g', screw bolts, e, and nuts, f, substantially as and for the purpose described.

2d, The combination of the round or dove tail adjustable nuts, s, screws, s', with the jaws, m, with the index, u, substantially as shown and set forth

78,133.—HELIOMETER.—Conrad Friedrich Ludwig Risch, Huntingburg, Ind.

I claim, 1st, A heliometer, constructed and arranged to operate in the manner herein shown and described.

2d, The plate, E, when arranged as herein shown and described, and when provided with a pointer, K, in combination with the curve, d, on the stationary frame, A, all made as set forth.

3d, The plate, F, when arranged as set forth, in combination with the curve, E, and pointer, l, on the stationary frame, A, all made and operating substantially as herein shown and described.

4th, The sun dial, H, on the revolving block, C, when combined with the plates, E and F, all made and operating substantially as herein shown and described.

5th, The sun dial, D, and gnomon, f, in combination with the semi-cylindrical dials, H and H', and their gnomons, g, all made as described.

6th, The manner herein shown and described of making, dividing, and arranging the plate, E.

78,134.—STEAM PIPE COUPLING FOR RAILROAD CAR HEATER. Henry R. Robbins (assignor to himself, J. J. Moran, and G. Colton), Baltimore, Md.

I claim, 1st, The combination of the pipe, D, with the sleeve, E, sliding pipe, F, having the opening, f, and the spring, G, substantially as and for the purpose specified.

2d, The cap, I, composed of one piece, and operating in connection with the spring, M, and pipe, C, substantially as and for the purpose described.

3d, The cap, J, composed of two parts, j j', and operating in connection with the pipe, F, springs, n n, sleeve, E, and cap, I, substantially as and for the purpose set forth.

4th, The combination of the pipes, C and E, sliding section, F, with the spring, G, when the parts are constructed to operate in the manner and for the purpose described.

5th, The combination of the two sliding caps, I and J, with connecting steam pipes, C F, to prevent the escape of steam from the joint formed where they connect, substantially as specified.

78,135.—ROLLING PIN.—Albert J. Roof, Peoria, Ill.

I claim a rolling pin, constructed in the form herein shown, and having combined therewith, in the manner described, a cake cutter and vegetable masher, the latter working with the springs, B, substantially as specified.

78,136.—HAY RAKER AND LOADER.—John Ruhl and Elial S. Herrington, Defiance, Ohio.

We claim the lever, N, slide, m, bar, L, and rod, p, combined, as and for the purpose set forth.

78,137.—CAKE CUTTER.—George O. Sanderson, Boston, assignor to himself and Frederick M. Baker, South Reading, Mass.

I claim, in a biscuit cutter, the combination and arrangement of the disk, B, spring, D, and stem, C C', substantially as described and for the purpose set forth.

78,138.—HOISTING APPARATUS.—James Sanderson, Fredericksburg, Ohio.

I claim the arrangement of the ways, A A, tilting frame, I, car, E, with its rollers, g g, hooks, x x, windlass, C D, and cord, m, the whole combined and operated as specified.

78,139.—CHURN.—Levi Scott, Burgettstown, Pa.

I claim the combination and arrangement of the wheel, P, rollers, N N, segment head, L, pendulum, J K, horizontal lever, G, weight, C, dasher rod, S, pitman, H, and brake, F, with the gearing, D D D D, and frame, A, constructed substantially as described.

78,140.—FEED WATER HEATER.—T. Shipton, Newark, N. J.

I claim, 1st, The cylinder, h, suspended from the lever, g, of the valve, f, and connected with the reservoir, a, by the flexible pipe, j, substantially as and for the purpose herein set forth.

2d, In combination with the reservoir, a, the elbow, b, having a flat lower surface, the exhaust pipe, c, and water supply pipe, d, provided with a broad flange, e, around its top, forming a seat for the valve, b, all constructed and arranged to operate as and for the purpose herein specified.

78,141.—TIRE TIGHTENER.—Silas Shirley, Santa Clara, Cal.

I claim, in the tip, B, having sockets for the felloes, the covers, F F, substantially as and for the purpose herein described.

78,142.—APPARATUS FOR BUNDLING CIGARS.—Charles A. Siecke, Philadelphia, Pa.

I claim the base, A, back, B, permanent frame, C, and adjustable frame, C', in combination with the adjustable rods, G and G', or their equivalents, the whole being constructed and arranged substantially as and for the purpose herein set forth.

78,143.—CARRIAGE WHEEL.—Anselmo B. Smith, Plattsmouth, Neb.

I claim, 1st, The wheel, consisting of the beveled and dove-tailed spokes, b, with the inner inclined ends resting upon the collar, d, surrounding the tube, C, and secured in place against the concave collar, G, by means of the loose collar, F, and nut, E, all constructed as described, for the purpose specified.

2d, The securing of the hub on the axle by means of the slot, e, in the axle, G, the key or slotted disk, H, and the screw cap, I, all arranged substantially as and for the purpose specified.

78,144.—HARVESTER.—Edward A. Smith, St Albans, Vt., and Haskell G. Smith, Goshen, Conn. Antedated May 9, 1868.

We claim the bush, e, made as set forth, and introduced in the end of the cutter bar, to receive the journal of the connecting rod, in combination with the oil receptacle, i, as and for the purposes set forth.

78,145.—FAN.—H. B. Smith, Essex, Conn.

I claim, as a new article of manufacture, a fan, whose handles, C, are pivoted to the outer ends of the extreme wings of the same, substantially as described, for the purpose of allowing them to be folded out of the way, as set forth.

78,146.—SEEDER AND CULTIVATOR.—Matthew D. Smith, Independence, Iowa.

I claim, 1st The combination of the pivoted lever, J, distributing rod, C, and slide, E, when arranged and operating as and for the purpose set forth.

2d, The combination of the lever, F, with the rod, G, and shovel arms, H', substantially as described.

78,147.—HORSE RAKE.—Moore Smith (assignor to himself and T. W. Wellington), Worcester, Mass.

I claim, 1st, The combination with lever, P, chain or cord, j, and stop piece, S, of the stop bar, R, said parts being arranged in relation to each other substantially as and for the purposes set forth.

2d, The combination with axle or head, A, of the foot piece, T, arm, m, and readle, U, substantially as and for the purposes set forth.

3d, The combination of the unlocking piece, G, with the grooved ring, F, and its inclined tooth or projection, e, substantially as and for the purposes set forth.

78,148.—WATER CLOSET.—William Sprague, Lynn, Mass.

I claim in combination with the casing, A, having outlet, F, and hinged seat, B, the concave cover, D, rock shaft, a1, link, e, pivoted lever, E, having extension, a2, and spring, G, all constructed and arranged to operate in the manner and for the purpose substantially as herein shown and described.

78,149.—BREAD, MEAT, AND VEGETABLE CUTTER.—George Stackhous, Mount Washington, Pa.

I claim, 1st, The inclined actuating surfaces, f f, connected with a hinged end, D, by rods, d d, all substantially as described, for the purpose of operating the knife, n, all as set forth.

2d, The movable partition, b, operated by spring tension, substantially as and for the purpose described, in combination with the inclined rods, f f, hinged end, D, and knife, n, all as set forth.

3d, The box, A A A C, having a sliding stop, B, hinged end, D, and slots, j, in combination with the spring, G, partition, b, and knife, n, all as set forth.

4th, The concave and convex strips, g g, subsantially as described, in combination with the inclined surface, f f, rods, d d, hinged end, B, and knife, n, for the purpose of imparting a lateral movement to the latter, all as set forth.

78,150.—DEVICE FOR REGULATING THE SUPPLY OF WATER TO STEAM GENERATORS.—H. P. Stafford and J. A. Leforgee, Decatur, Ill.

We claim the arrangement of the float, A, stem, B, solid ball, R, spindle, C, valve, E, box, D, perforated arm, F, adjustable connecting rod, J, slotted arm, H, stem, s, and elliptical valve, G, in the supply pipe, P, all constructed and operated as herein shown and described.

78,151.—ARTICULATOR.—Eli T. Starr, Philadelphia, Pa.

I claim, 1st, The attachment of the lower plate, A, to the upper plate, B, or its bracket, by cone-shaped pivots, a, arranged to fit V-shaped grooves, b, and retained in position by springs, substantially as specified.

2d, Constructing the reversible upper plate, B, with a crook, as at d, essentially as and for the purpose herein set forth.

78,152.—SCUTTLE COVER AND LADDER.—Joseph Steger, New York city.

I claim. 1st, The arrangement of a lever, e, connecting the ladder, A, and cover, B, substantially as and for the purpose described.

2d, The lock catch, D, in combination with the ladder, A, and scuttle cover, B, substantially as and for the purpose set forth.

78,153.—ANTI-FRICTION ROLL.—F. A. Sterry, Canton, Mass.

I claim as a new article of manufacture, a self-lubricating wheel for pulleys, sheaves, etc., constructed as described, consisting of the plates or raw hide, C, soaked in oil, revolving upon the shaft, A, and held in position by means of the rivets, D, and metallic plates, B, as herein described, for the purpose specified.

78,154.—TRACE HOLDER.—Stephen Stout, Tremont, Ill.

I claim the device, B E F, formed by forming the hooks, E, and guard loops, F, upon or attaching them to the ring, B, constructed substantially as herein shown and described and for the purpose set forth.

78,155.—CRIBBING PREVENTER.—Michael H. Sullivan, Providence, R. I.

I claim, 1st, The combination of the pricking points, g, screw shank, b, hollow spindle, a, spring, s, and plate, B, substantially as described, for the purpose specified.

2d, The plate, B, in combination with the longitudinally sliding pricking points, g, substantially as and for the purpose shown and described.

78,156.—MODE OF ORNAMENTING FABRICS.—William Swan (assignor to himself and Luis Duhain, Jr.), New York city.

I claim an ornamental fabric provided with drops or beads, a a, that are composed of the material, and are made and applied in the manner, substantially as herein shown and described.

78,157.—BRACE FOR BITS.—Isaac C. Tate, New London, Conn.

I claim the combination of the spring jaws, C, with the socket, of the bit stock, substantially as herein shown and described.

78,158.—PENCIL HOLDER.—Ed. J. Toof, Fort Madison, Iowa.

I claim, 1st, The combination of the case, b, and its erasing pad, B, with the liner case, a, and finger rest, d, all constructed and operating substantially as shown and described and for the purpose set forth.

2d, The attachment of an erasing pad, B, to the pencil end of a pencil case or holder, substantially as shown and described and for the purpose set forth.

78,159.—APPARATUS FOR FREEZING.—Jean Baptiste Toselli, Paris, France.

I claim, 1st, The method of congealing and cooling liquids by the application of the chemical refrigerating substances, substantially as herein described.

2d, The successive mixture and combination of water and sub-carbonate of soda with nitrate of ammonia, as and for the purpose herein described.

3d, The apparatus herein described, or its substantial equivalent, for congealing and cooling liquids with chemical refrigerating substances, substantially as described.

78,160.—LAMP CHIMNEY CLEANER.—J. J. Wait, Oreana, Nev.

I claim the combination of the cushion, G, and the spring, E, the thumb piece, F, at the lower end of the spring, and the slide, D, operating on the guide plate, C, the whole constructed and made to operate substantially as and for the purpose herein described.

78,161.—SNOW PLOW.—W. Y. Warner, Wilmington, Del.

I claim, 1st, The steam pipes, F, arranged beneath the body of the car, parallel to the track, in combination with a pipe or pipes, E, having nozzles so arranged that steam may be discharged in a series of jets on to the track between the rails, as and for the purpose described.

2d, The combination of the above and the water reservoir, D, as and for the purpose specified.

3d, A casing surrounding a track-cleaning apparatus, in combination with a flue or flues, H, arranged to conduct the vapors from the casing, substantially as and for the purpose set forth.

78,162.—SLED.—Seth Way, La Porte, Ind.

I claim the combination of the knees, E E, head block, C, thimbles, I I, braces, J J, and tongue, K, respectively, constructed and arranged substantially as set forth.

78,163.—WEAVING PILE FABRICS.—William Webster, Morrisania, N. Y.

I claim, 1st, In combination with the pusher, the spring, A2, sliding block, A3, and spring, A6, all constructed and arranged substantially as described.

2d, The herein-described apparatus for operating pile wires, when constructed and arranged substantially as described.

78,164.—HAMMER HANDLE.—David Weiser, Philadelphia, Pa.

I claim the handle, D, collar, B, its check pieces, d d', with beveled ends, adapted to the dovetailed recess, e, in the head of a hammer or other tool or implement, the whole being constructed and arranged substantially as and for the purpose herein set forth.

78,165.—RAILROAD SWITCH.—William Wharton, Jr., Philadelphia, Pa.

I claim the permanent rail, A, and laterally-flexible rail, A', of the main track, in combination with the movable switch rail, D, forming a continuation of the rail, B, of the turnout, and the fixed rail, B', of the same, the whole being arranged and operating substantially as and for the purpose herein set forth.

78,166.—CAR BRAKE.—Thomas J. Whitney, Whitpain Township, Pa. Antedated May 9, 1868.

I claim, 1st, The buffer bar, A, rod, C, band, O, rock arm, H, rods, c c', lever, D, bolt, T, and the rubber block or spring, S, when constructed and combined as shown.

2d, The notched rod, C, and the rod, N, in combination with a clamp fixed to the axle, K, of a car, as shown.

3d, The notched rod, C, in combination with the rock arm, H, rods, c c', lever, D, rod, G, and the brake bars, E and F, as shown and described.

78,167.—LIFTING JACK.—Jas. Wilkinson, Bowling Green, Mo.

I claim, 1st, The posts, A A, when provided with the segmental serrated grooves, a1 a3, and combined with a movable fulcrum, B, substantially in the manner and for the purpose herein shown and described.

2d, The fulcrum head, B, when provided with the spring bearing pins, b, and otherwise arranged, as herein set forth and described.

78,168.—TREATING METALS AND MINERALS.—Zabdiel A. Willard, Boston, and William G. Adams, Franklin, Mass.

We claim, 1st, The process of dispersing or subdividing melted metals or minerals into fine particles, by means of a blast of highly compressed air or other gases, which impinges upon one or more fine streams thereof, the gases present, and the temperature of the metal, being respectively such that chemical action shall be thereby prevented, substantially as described.

2d, The process of converting metals or minerals into other products, by means of a jet or blast of air or gas, acting upon one or more fine streams of said metals or minerals in a melted state, as described, which jet or blast subdivides and disperses the material, and also acts chemically upon the same, substantially as described.

3d, The process of converting metals or minerals into other products by means of a blast of air or other gas applied thereto, when said metals or minerals are continuously supplied in regulated quantities to said blast in a subdivided and highly heated condition, substantially as described.

4th, The treatment of metals or minerals, by either of the methods before claimed, in a chamber filled with an atmosphere chemically so composed that by means of the same, in combination with the gas introduced by the dispersing blast, the desired chemical reaction may be produced or prevented, substantially as described.

5th, An apparatus (for performing some of the operations described), consisting, substantially, of the combination of a crucible or reservoir with one or more delivering jets, a furnace for heating the same, and one or more blast pipes, corresponding to said jets, co-operating substantially as described.

6th, An apparatus, consisting of the combination last claimed, in combination with the converting chamber, substantially as described.

7th, Combining with the converting chamber, as described, a means for supplying gas thereto separate from the dispersing blast, substantially as described.

78,169.—HORSE HAY FORK.—Linus Woodworth, Troy, Pa.

I claim the two bows, pivoted together, and having their extremities pointed, and furnished with lateral spurs or shoulders, in combination with the toggle bar, slide bar, and shank, substantially as and for the purpose specified.

78,170.—WINDING STOP FOR WEIGHT CLOCKS.—O. H. Woodworth, Columbia City, Ind. Antedated May 7, 1867.

I claim, 1st, The application of the ascending motion of the weights of weight clocks, when such weights are being wound up, to the stopping of the winding of the clock at any desired point in the ascent of the weights, for the purposes specified.

2d, The construction and application of a weight clock winding stop, operated by the ascending motion of the clock weights when they are being wound up, substantially in the manner and for the purposes described and illustrated.

3d, The combination and arrangement of the elevating rod, e, the connecting rod, r, the stopping pawl, u, and the stops, o, when used in connection with the winding shaft, n, and weight, W, in the manner described and for the purposes mentioned.

78,171.—CORN PLANTER.—Jacob J. Wright and John H. Penny, Harrison, Ohio.

We claim, 1st, The hinge joint, F, and adjusting chain, G, when used in combination as a means of giving mobility and adjustment to the plough and seed box for the purpose specified.

2d, The covering shares, J, when swiveling on or near the axle of the ground wheels or wheels as described, and for the purpose specified.

3d, The gravitating round headed plug, R, for the purpose described.

78,172.—FURNACE FOR BOILING AND PUDDLING IRON AND OTHER METALS.—John Zimmer, Pittsburgh, Pa.

I claim a cast iron puddling basin or chamber, having a bosh or water space cast therein around its sides, in combination with an elevated water tank, and communicating with each other by means of supply and outlet pipes, the whole being constructed, arranged, and operating substantially as and for the purposes herein set forth.

REISSUES.

2,932.—ROOFING COMPOUND.—Oscar N. Bartholomew and J S. Thurston, Elmira, N. Y., assignees by mesne assignments of Oscar N Bartholomew. Patented October 8, 1867.

We claim a composition of matter compounded from the ingredients named and in the manner substantially as and for the purpose set forth.

2,933.—PREPARING CEMENT FROM SLAGS.—John James Bodmer, Newport, England. Patented November 5, 1867.

I claim, 1st, The rolling, laminating, grinding, and otherwise reducing or converting to scale or sheets, or to a lamellated or to a pulverulent state or condition, the cinder, slag, or scoria obtained from blast furnaces, copper smelting and other furnaces, in a fluid or semi-fluid or pasty or vicious condition, in the manner and for the purposes substantially as described, and for other purposes.

2d, The rolling, laminating, grinding, and otherwise reducing or converting to scale, or to a lamellated or to a pulverulent condition, of various descriptions of cement, and of materials from which cements are to be produced substantially as described.

3d, The application of slag, cinder, or scoria, whether artificially prepared for the purpose, or as obtained from blast furnaces or other furnaces, in the manufacture of cement, and the several modes or processes employed in the preparation of cements, substantially as described.

4th, The manufacture of artificial stone from the above-described cements, either by themselves, or with the admixture of coarsely ground materials, such as furnace slags, scoria, any descriptions of hard stones, or of shingle, sand, or other materials of a similar nature.

2,934.—FIRE PLACE.—W. D. Guseman, Morgantown, W. Va. Patented June 30, 1863.

I claim, 1st, The curved sliding blower, E, in combination with the curved plate, D, and grate, B, arranged to project in front of the chimney, as herein described, for the purpose specified.

2d, The damper, in combination with the flue, sliding blower, or screen and grate, all arranged substantially in the manner as and for the purpose set forth.

2,935.—METALLIC SHANK FOR BOOT AND SHOE.—Edward Heaton, New Haven, Conn. Patented February 23, 1864.

I claim, 1st, A boot or shoe shank, composed of two strips, of different elasticities, the one being of a flexible but not necessarily elastic material, and the other of an elastic material, united, substantially as and for the purposes herein shown and described.

2d, The combination of a tempered and an untempered spring, in the manner and for the purposes herein shown and set forth.

3d, The combination, with a boot and shoe shank, of otherwise ordinary or suitable construction and material, of a spring united with the said shank, so as to bear upon the same at both ends thereof, substantially in the manner herein shown and specified.

2,936.—ATTACHING ORNAMENTAL HEADS TO NAILS AND SCREWS.—Thomas C. Richards, New York city. Patented December 31 1867.

I claim the attaching of ornamental heads to nails and screws by means of a clasping recess or groove formed on or attached to the inner side of the ornamental head, so as to admit the lateral or transverse insertion of the head proper of the nail or screw, substantially as shown and described.

2,937.—HORSE RAKE.—C. M. Titus, Ithica, N. Y., assignee by mesne assignments of E. L. Bergstresser, Hublersburg, Pa. Patented August 26 1862.

I claim, 1st, A lifting or pressure bar, provided with hanging loops or staples, by means of which the rake teeth are lifted to discharge their load.

2d, The pendent loops or staples, in combination with the rake teeth and lifting bar, all arranged as described.

3d, The lifting or pressure bar, provided with lifting loops or staples, in combination with a lever connected therewith for operating the same, as described.

2,938.—VULCANIZING FLASK.—A. B. Woodward (assignor to himself and Thomas Ellis), Alfred Centre, N. Y. Patented January 16, 1866.

I claim, 1st, Closing the flask, A, within the vulcanizing vessel, by the pressure of steam, substantially as herein shown and described, so that while the rubber is gradually heated, the flask is gradually and automatically closed and the rubber moulded when in its most plastic state.

2d, Applying steam pressure to close the flask, A, within the vulcanizing vessel, by means of a piston.

3d, Forming segmental flanges, j, upon the interior of the vulcanizing vessel or boiler, C, and corresponding segmental flanges, k, upon the exterior of the upper part or cover b of the flask A, substantially as herein shown and described, for the purpose of locking the said flask in and to the said vessel.

4th, The segmental connections, e, of the receiver, B, in combination with the flattened sides of the flask, A, and with the piston, f, substantially as herein shown and described, and for the purpose set forth.

5th, The combination of the annular plate, g, and ring packing, i, with the piston, f, and boiler or vulcanizing vessel, C, substantially as herein shown and described, and for the purpose set forth.

2,939.—PULLEY ATTACHMENT FOR RAISING WEIGHTS.—Geo. W. Gregory, Watertown, N. Y. Patented August 14, 1866. Antedated February 14, 1866; reissue No. 2,784, dated October 22, 1867.

I claim, 1st, An adjustable pulley support, having one or more sockets, or their equivalents, by and through which the pulley support may be operated and changed from place to place, substantially as described.

2d, An adjustable pulley support, provided with sockets or equivalents, and with means for supporting the pulley, substantially as described.

3d, The combination of an adjusting pole with a pulley support, having sockets or equivalents, substantially as and for the purpose set forth.

2,940.—COMPOSITION FOR THE MANUFACTURE OF WATER PROOF PAPER, AND OTHER ARTICLES.—Robert O. Lowrey, Salem, N. Y. Patented December 10, 1867.

I claim, 1st, The use of salt, in combination with any of the salts of alumina, or similar astringent material, for rendering a gelatinous compound or mixture insoluble in water, substantially as described.

2d, The use of salt, in combination with the salts of alumina, or similar astringent material, for rendering soapy compounds or mixtures insoluble in water, substantially as and for the purposes set forth.

3d, The use of alum or any of the salts of alumina, for rendering a soapy compound insoluble in water, when said soapy compound has been previously incorporated with paper pulp or fiber, substantially as described.

4th, The use of glycerin, in combination with a gelatinous or a soapy compound, when applied to fibrous materials, substantially as set forth.

5th, The new compound or composition of matter produced by the treatment of fibrous material, substantially as herein described.

6th, The process herein described of treating fibrous material, for producing a new compound, substantially as described.

2,941.—ATTACHING DOOR KNOBS TO SPINDLES.—Darius Skidmore, Seneca Falls, N. Y. Patented July 15, 1852. Reissue No. 2,473, dated February 5, 1867.

I claim covering or enclosing the end of the coupling device of the knob shank and spindle wholly or partially by the socket or sleeve of the rose, substantially as and for the purpose herein specified.

2,942.—MACHINERY FOR MAKING HAT BODIES.—Eliza Wells, Brooklyn, N. Y., administratrix of the estate of Henry A. Wells, deceased. Patented April 25, 1846; reissue No. 906, dated September 30, 1856; extended seven years; reissue No. 1,087, dated December 4, 1860; again extended seven years by act of Congress.

I claim, 1st, The combination of the rotating brush or picker, substantially such as described, the rotating pervious cone, provided with an exhausting mechanism, substantially as described, and the bottom plate or guide, substantially as described, for directing the fur fibres towards the lower part of the cone, and preventing the fibres going to waste, the said combination having the mode of operation specified, and for the purpose set forth.

2d, The combination of the feed apron, the rotating brush or picker, substantially as described, the rotating pervious cone, provided with an exhausting mechanism, substantially as described, and the guide or deflector, for directing the fur fibers on to the tip and upper part of the cone, substantially as described, the said combination having the mode of operation specified, and for the purpose set forth.

3d, The combination of the rotating brush or picker, substantially as described, the rotating pervious cone, provided with an exhausting mechanism, substantially as described, and the side guides, or either of them, substantially as described, to prevent fur fibres from getting out of the proper influence of the currents traveling to the cone, and to protect the traveling fibres from disturbing currents, the said combination having the mode of operation specified, and for the purposes set forth.

4th, The combination of the feeding apron, on which the fur can be placed in separate batches, as described, the rotating brush or picker, substantially as described, the rotating pervious cone or former, provided with an exhausting mechanism, substantially as described, the said combination having a mode of operation substantially such as described.

5th, The combination of the feed apron, on which the fur fibres can be placed in separate batches, each in quantity sufficient to make one hat body, the rotating brush or picker, substantially as described, the rotating pervious cone, provided with an exhausting mechanism, and the devices for guiding the fur fibres, substantially as described, the combination having the mode of operation specified, and for the purpose set forth.

6th, In combination with the pervious cone provided with an exhausting mechanism, substantially as described, the covering cloth, wet with hot water, substantially as and for the purpose specified.

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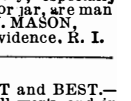

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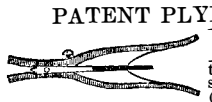

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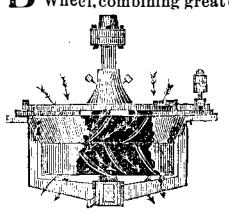

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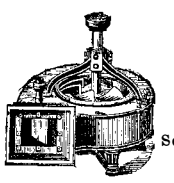

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